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Network Interface Card

User's Manual

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1) 10/100Base-T

USER INSTRUCTIONS (For U.S.A.)

FCC PART 15- RADIO FREQUENCY DEVICES WARNING-

FCC: Declaration of Conformity	
Product Type	Network Interface Card
Product Name	4179-435
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Hitachi Koki Imaging Solutions, Inc. 1757 Tapo Canyon Road, Simi Valley, California 93063	

Note

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, users and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

- The design and production of this unit conform to FCC regulations, and any changes or modifications must be registered with the FCC and are subject to FCC control.
- Any changes made by the purchaser or user without first contacting the manufacturer will be subject to penalty under FCC regulations.

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INTERFERENCE-CAUSING EQUIPMENT STANDARD (ICES-003 ISSUE 3) WARNING

- This Class A digital apparatus complies with Canadian ICES-003.
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CE Marking (Declaration of Conformity) CE

We declare under our sole responsibility that the Network Interface Card for use with Hi-35*pc* Printer Controller, to which this declaration relates are in conformity with the specifications below.

This declaration is valid for the area of the European Union (EU) only.

Product Type	Network Interface Card
Product Name	4179-436
Standard	Safety *2: EN60 950 / 1992 (A1:1993, A2:1993, A3:1995, A4:1997) (Safety of information technology equipment, including electrical business equipment) EN 60825 / 1992 (A11:1996) (Safety of laser products-Part 1:Equipment classification, requirements and users guide) EMC*1: EN 55 022 (Class B) / 1994 (A1:1995, A2:1997) (Limits and method for measurement of radio disturbance characteristics of information technology equipment (ITE)) EN61000-3-2 / 1995 (Electromagnetic compatibility (EMC) - Part 3: Limits, Section 2: Limits for harmonic current emissions (equipment input current ≤ 16A per phase)) EN 50 082-1 / 1992 (Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial and light industry) IEC 801-2 / 1991 (Electrostatic discharge requirement) IEC801-3 / 1984 (Radiated electromagnetic field requirement) IEC 801-4 / 1988 (Electrical fast transient / burst requirement) Notes : *1) EMC performance: This product was designed for operation in a typical office environment. *2) First year of labeling according to EC-directive 73/23/EEC and 93/68/EEC: 98 3) This product was designed for operation in a typical office environment.
EC Directive	EMC: 89/336/EEC and 93/68/EEC

This device must be used with shielded network (10/100Base-T) cable. The use of non-shield cables is likely to result in interference with radio communications and is prohibited under 89/336/EEC rules.

2) 10BaseT/2

USER INSTRUCTIONS (For U.S.A.)

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FCC: Declaration of Conformity	
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Product Name	4179-425
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WARNING

- The design and production of this unit conform to FCC regulations, and any changes or modifications must be registered with the FCC and are subject to FCC control.
- Any changes made by the purchaser or user without first contacting the manufacturer will be subject to penalty under FCC regulations.

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- Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

USER INSTRUCTIONS (For Europe)

CE Marking (Declaration of Conformity) CE

We declare under our sole responsibility that the Network Interface Card for use with Hi-35*pc* Printer Controller, to which this declaration relates are in conformity with the specifications below.

This declaration is valid for the area of the European Union (EU) only.

Product Type	Network Interface Card
Product Name	4179-426
Standard	Safety *2: EN60 950 / 1992 (A1:1993, A2:1993, A3:1995, A4:1997) (Safety of information technology equipment, including electrical business equipment) EN 60825 / 1992 (A11:1996) (Safety of laser products-Part 1:Equipment classification, requirements and users guide) EMC*1: EN 55 022 (Class B) / 1994 (A1:1995, A2:1997) (Limits and method for measurement of radio disturbance characteristics of information technology equipment (ITE)) EN61000-3-2 / 1995 (Electromagnetic compatibility (EMC) - Part 3: Limits, Section 2: Limits for harmonic current emissions (equipment input current ≤ 16A per phase)) EN 50 082-1 / 1992 (Electromagnetic compatibility - Generic immunity standard Part 1: Residential, commercial and light industry) IEC 801-2 / 1991 (Electrostatic discharge requirement) IEC801-3 / 1984 (Radiated electromagnetic field requirement) IEC 801-4 / 1988 (Electrical fast transient / burst requirement) Notes : *1) EMC performance: This product was designed for operation in a typical office environment. *2) First year of labeling according to EC-directive 73/23/EEC and 93/68/EEC: 98 3) This product was designed for operation in a typical office environment.
EC Directive	EMC: 89/336/EEC and 93/68/EEC

This device must be used with shielded network (10Base-T and 10Base2) cable.
The use of non-shield cables is likely to result in interference with radio communications and is prohibited under 89/336/EEC rules.

Welcome

Congratulations on your selection of this quality Hitachi Koki Imaging Solutions, Inc., Network Interface Card.
This User's Manual provides information about set-up the Network Interface Card and operating the printer in the network environment.

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MEMO

Chapter 1

Introduction

This Network Interface Card (NIC) is a multi protocol device that is designed to support an Ethernet connection exclusively with the Printer Controller. This Network Interface Card (NIC) has the following features:

- Auto recognition of 10Base2 and 10BaseT Ethernet types by the 10BaseT/2 Type card, and auto recognition of 10BaseT and 100BaseT Ethernet types by the 10/100BaseT Type card.
- Fully transparent AppleTalk printing support for the Macintosh, including support for binary PostScript printing.
- Peer-to-Peer (serverless) discovery printing from Windows 95 or Windows NT 4.0 workstations, without a Novell file server present and without using IP is made possible through using IPX.
- Novell NetWare PSERVER on both bindery based and Novell Directory Services (NDS).
- lpr/lpd over TCP/IP for UNIX platforms and Microsoft's Windows.
- Raw sockets support over selectable TCP/IP port with filters for selected UNIX environments.
- IP and IPX SNMP support of MIB-2 and DPI proprietary NIC MIB.
- SNMP support of standard MIB and proprietary printer MIB's on compatible printers.
- Flash memory to allow field upgrades, with capability for either IPX/SPX or TCP/IP (FTP) download of executable code.
- Network and printer settings from a Web Browser.
- FTP printing to allow users to print directly from their Web Browser or other FTP client.

1.1 What's in the Package

The Print Server contains the following:

- Network Interface Card (NIC)
- Setup Guide
- Quick Configuration Guide
- CD-ROM
 - Network Interface Card User's Manual
 - Printer Management Utility
 - Quick Configuration Guide
 - NIC MIB Definition
 - Utility Software
 - IP Peer-to-Peer Printing Program
 - IPX/IP Management Access Program (MAP)
 - IPX Peer-to-Peer Printing Program
 - AppleTalk NIManage Utility
 - UNIX TCP/IP Utility
- 2 Spacers (to adjust NIC height)
- Flat cable (for connecting the NIC and printer unit)
- 2 Screws (for spacer)
- Ferrite core
- 2 Tie band (for securing the ferrite core.)

The CD-ROM contains the ASN.1 coded SNMP MIB for the NIC. This MIB can be loaded into a standard SNMP console to provide SNMP access to all NIC parameters.

BOOTP programs for Windows (to assist entering IP parameters in a Windows environment) are also included on the CD-ROM.

The CD-ROM may contain a ReadMe file containing the latest information about installation and operation. Check for these files before going any further with installation.

Instructions and software to perform flash downloads are provided with any update or upgrade package and are not included in this manual.

1.2 Hardware/NOS Requirements

The Network Interface Card hardware and software require the following:

Version of Protocol or NOS	Novell NetWare Version 2.15, 3.x, or 4.x.
	Macintosh System 7.x, MacOS8.x
	UNIX, Windows, or LAN Server systems supporting lpr over TCP/IP
	DEC ULTRIX 4.3 or 4.4, DEC OSF/1 2.0 or 3.0, Solaris 1.1.3 or 2.3, (SUN OS 4.1.3 or 5.3), System V Release 4, HP-UX 9.01, IBM AIX 3.2.5, or SCO UNIX 2 for DPI TCP/IP port 10001.
Software	Novell NetWare printing requires NetWare Capture, NPRINT and PCONSOLE (later than 1.0) utilities.
	IPX/IP Management Access Program (MAP), IP discovery Program, IPX Peer to Peer Printing Program, and IP Peer to Peer Printing require Windows 95 or Windows NT4.0.
	TCP/IP setup and maintenance may be done with Telnet. Monitoring and maintenance with HTTP requires a suitable internet Web Browser program supporting HTML.
	AppleTalk printing requires printer PPD appropriate to the printer. AppleTalk NIManage Utility Program is provided for setup and maintenance.
Hardware	CD-ROM drive on the workstation to accept Windows, Macintosh, or UNIX utilities.

Network Environment	**When using cards that are 10/100BaseT compliant:** 10 MB or 100 MB Ethernet that uses a twisted pair cable **When using cards that are 10 BaseT/2 compliant:** 10 MB Ethernet that uses a twisted pair cable or a 10Base2 Ethernet (also known as a Thinnet)

Chapter 2

Installing the Network Interface Card

2.1 Preparing the Printer

If the printer can generate a test or status report, you should generate one before you begin. This will give you detailed information on the identification and configuration of your printer, as well as ensuring that the printer is properly set up and operating.

1. Make sure that the printer is operating properly. Check to see that paper is in the paper drawer and toner cartridge is full.
2. Turn off the printer and remove the power cord.
3. Install the NIC in the option port.

Note

- **Handling Precautions for Static Sensitive Devices:** The NIC is designed to protect sensitive components from damage due to electro-static discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment.

2.2 Powering Up the Printer

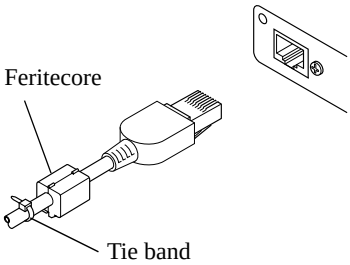
Use the following procedures to power up the printer. Do this before the printer is attached to the network to verify the physical installation of the NIC.

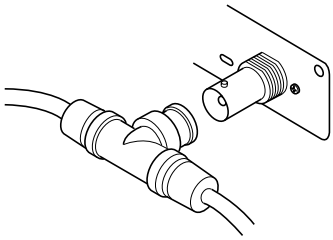
1. Plug in the power cord.
2. Turn on power and wait for the printer to warm up. The printer may print out a status report (if this option is not disabled). The NIC then provides a print job to the printer which contains the NIC status information. Refer to *7.2 Status/Configuration Report*, for more information.
3. Check the NIC status report. Record the serial number and the Network address or save the status report. You need this information when you configure the printer for your network.
4. Power down the printer.
5. Connect the network cable between the NIC and a network drop. See *2.3 Connecting to a Network the NIC*, for network connection information.

2.3 Connecting to a Network the NIC

Use an RJ45 connector (10/100BaseT) or BNC connector (10Base2) to connect to an Ethernet.

1. Turn off the printer.
2. Connect the connector to the NIC.





10/100BaseT:
Plug an RJ45 connector into the 10/100BaseT port on the back of the NIC. Attach the ferrite core so that it is near the connector. Next, secure the ferrite core so that it cannot move out of position using the tie band.

10Base2:
Use a BNC T adapter to connect to the BNC connector on the back of the NIC.

3. After you make the connection, perform the procedure under *2.2 Powering Up the Printer*.

Note

- Use a Category 5 cable when connecting with a 10/100BaseT.
- Be sure to use a cable with a ferrite core when making a 10/100BaseT connection.

Chapter 3

Utilizing Windows Programs

The CD-ROM contains the following programs for the Windows environment.

- **Discovery Program**

This program automatically searches for NICs on a network. Found NICs are listed in the Web Browser being used. Clicking a NIC name accesses the card's onboard HTTP server, which you can use to make various NIC settings. See *Appendix C* of this manual for details.

The Discovery Program generally utilizes the MAP (Management Access Program) to find an IP or IPX based NIC. Once found, the Discovery Program allows you to make setting changes through the NIC's built-in Web page.

- **Peer-to-Peer Printing Program**

This program provides peer-to-peer printing capabilities, without having to go through the server. Peer-to-peer printing can be enabled by installing IP peer-to-peer printing under a TCP/IP environment, or by installing IPX Peer-to-Peer printing program under an IPX/SPX environment.

3.1 Discovery Program – Management Access Program (MAP) –

The Management Access Program (MAP) uses a Windows-based Web Browser linked with a proprietary bi-directional IPX/IP channel program to allow access to the NIC's HTML-based monitoring and maintenance capabilities. It is possible to search and manage IPX and IP based printers with this program, however it is necessary to first install TCP/IP, and preferably IPX/SPX protocols and a Web Browser onto your PC. This program allows you to:

- Configure your network protocols for the NIC.
- Reset the NIC remotely to either clear an error condition, or return the print server to its factory default settings.
- Troubleshoot problems in the NIC.
- Enable or disable the status report printout.

Note

- To be able to change parameter values with the MAP or the Web Browser, you must know the NIC management password. The factory default password is "**sysadm**".

3.1.1 Installing the MAP

Use the following procedure for an automatic installation of the MAP. If the opening screen does not appear as described in step 1, follow the instructions for the manual installation procedure.

1. Insert the CD-ROM into your workstation's CD-ROM drive. The opening screen appears automatically.
2. Click the **CD-ROM Contents** button to display the **Introduction** screen.
3. Click **Installation/Configuration Programs** located at the bottom of the **Introduction** screen.
4. Select the program that you want to install and follow the instructions displayed on the screen.

You can use the following procedure to manually install the MAP.

1. Insert the CD-ROM into your workstation's CD-ROM drive.
2. Run the program. (In this example, we assume that drive D: is your workstation's CD-ROM drive.)

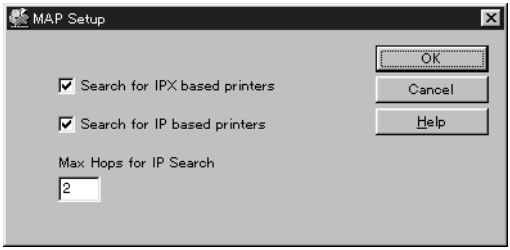
 D:\Map\Setup.exe

3. Follow the instructions that appear on the screen.

The default installation directory is C:\Program Files\Map. You can change to a different directory if you want.

3.1.2 Configuring the MAP

1. Click **Start**, point to **Programs**, and then point to **MAP**.
2. Click **MAP Setup**.



Search for IPX based printers:
Check this option to search for IPX/SPX based printers.

Search for IP based printers:
Check this option to search for TCP/IP based printers.

Max Hops for IP Search:
Type in a maximum hop value. The initial default value is 2.

Note

- The maximum hop value defines the maximum number of subnetworks the program will search to find a NIC. Setting a value 0 tells discovery program to search only within the subnet to which the workstation is connected. A hop value of 2 tells discovery program to search all networks accessible through as many as two routers. A value of 15 or greater specifies automatic search of all connected networks, but this is not recommended because of the amount of traffic it generates.

3. After the settings are the way you want, click **OK** to set them and close the dialog box.

3.1.3 Using the MAP

Use the following procedure to start up MAP and search for all compatible NICs that are available on a network.

1. Click **Start**, point to **Programs**, and then point to **MAP**.
2. Click **MAP**.

A list of NICs found by the MAP search appears on the Web Browser installed on the workstation.

To configure or reconfigure a particular NIC, click its serial number in the Web Browser list.

Clicking a NIC serial number displays the Printer Management page of the card's onboard HTTP server. See *Appendix C* for details of how to use this page to configure or reconfigure the NIC.

3.2 IP Peer-to-Peer Printing Program

This section describes how to set up and use the IP Peer-to-Peer Printing program. With the setup procedure, you set up your print server ports for printing from a Windows environment.

3.2.1 Installing the IP Peer-to-Peer Printing Program

Use the following procedure for automatic installation of the IP Peer-to-Peer Printing Program. If the opening screen does not appear as described in step 1, follow the instructions for the manual installation procedure.

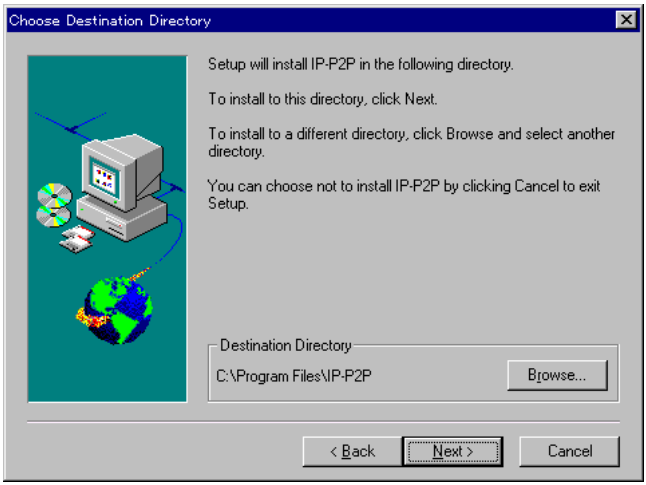
1. Insert the CD-ROM into your workstation's CD-ROM drive. The opening screen appears automatically.
2. Click the **CD-ROM Contents** button to display the **Introduction** screen.
3. Click **Installation/Configuration Programs** located at the bottom of the **Introduction** screen.
4. Select the program that you want to install and follow the instructions displayed on the screen.

You can use the following procedure to manually install the IP Peer-to-Peer Printing program.

1. Insert the CD-ROM into your workstation's CD-ROM drive.
2. Run the program. (In this example, we assume that D: is drive your workstation's CD-ROM drive.)

 D:\Ip-P2p\Setup.exe

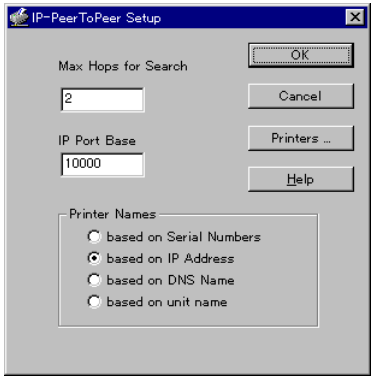
3. Follow the instructions that appear on the screen.



The default installation directory is C:\Program Files\IP-P2P. You can change to a different directory if you want.

3.2.2 Setting Up IP Peer-to-Peer Printing

1. Click **Start**, point to **Programs**, and then point to **IP-P2P**.
2. Click **IP-P2P**.
3. This displays the setup dialog box.



Max Hops for Search:

Type in a maximum hop value. The initial default value is 2. See the note under *3.1.2 Configuring the MAP* for an explanation about maximum hops.

IP Port Base:

This is the starting port number for the printserver. The default is 10000 (corresponding to a TCP/IP port of 10001) but you can change it if you need to.

Printer Names:

These settings let you select what format to use when displaying the printer list.

Based on Serial Numbers
Select this option to identify printers according to printer server serial number. If SN991354 is the printer serial number, for example, SN991354 is the printer port.

Based on IP Address
Select this option to identify printers according to IP address. If 199.99.92.99 is the printer IP address, for example, 199.99.92.99 is the printer port.

Based on DNS (Domain Name Server)
Select this option to identify printers according to DNS name.

Example:
<PTR-MKTG.DOMAIN.COM>.

Based on Unit Name
Select this option to identify printers according to unit name.

Example:
<MLT_999999>.

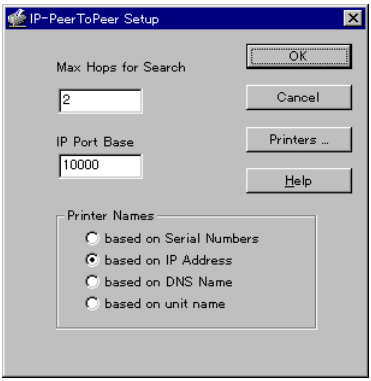
4. After the settings are the way you want, click **OK** to set them and close the dialog box.

3.2.3 Adding Printers for IP Peer-to-Peer Printing

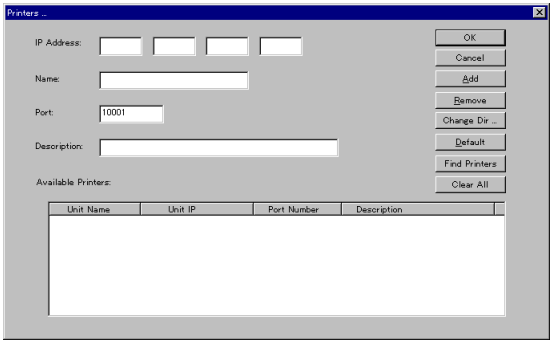
The following steps can be used to manually add a printer that cannot be found automatically due to router setup or the maximum hop count setting. Note, however, that manual addition of printer is normally not required.

Step 1: Use P2P-IP to make the printer an IP peer-to-peer printer.

1. Click **Start**, point to **Programs**, and then point to **IP-P2P**.
2. Click **IP-P2P** to display the Peer-to-Peer IP Setup dialog box.



3. Click the **Printers** button to display a dialog box for input of a new printer.



4. Click the **Find Printers** button to automatically search the network for a printer as well as to register it.
 When registering a printer manually, enter the appropriate information for the following field descriptions and click the **Add** button.

Field Descriptions

IP Address:
Type in the IP address of the printer you want to add.

Name:
Type in the name you want to assign to the printer. Assign a name you feel best identifies the printer.

Port Number:
Type in the port number of the printer. The default port number setting is 10001.

Description:
Type in text that describes the printer.

5. Click **OK** after you have finished adding all the printers you want.

Setp2: Installing the Printer Driver and Setting the Printer Port

1. Using the install program, install the printer driver that comes with the printer.
 Refer to the manual that came with the printer for details.
2. Open the **Properties** menu item of the printer icon.
3. Select the **Detail** tab.
4. Select the port that you want from the **Print to the following port** item.

3.3 IPX Peer-to-Peer Printing Program

The IPX Peer-to Peer Printing Program enables IPX Peer-to-Peer printing in a Windows 95 or Windows NT 4.0 environment.
The following are the characteristics of IPX Peer-to-Peer printing.

- IPX Peer-to-Peer printing implements peer-to-peer bi-directional printing between Windows workstations and NIC printers.
- The Peer-to-Peer implementation uses the IPX/SPX stacks that are provided with Windows 95 or Windows NT4.0.
- The IPX Peer-to-Peer Printing program establishes a connection with the printers supporting Peer-to-Peer, without using an intermediate file server, whether or not your network uses Novell NetWare.
- If you are not using NetWare, you do not need to activate any NetWare Client application.

Note

- The IPX Peer-to-Peer Printing program uses IPX/SPX Compatible Protocol, so you must install IPX/SPX Compatible Protocol on your workstation if it is not already installed. See the documentation that comes with Windows for details about installation.
- Because Peer-to-Peer uses the IPX/SPX Protocol, Novell operation must remain enabled on the NIC, even if traditional Novell printing facilities are not being used. The name of the Peer-to-Peer printer, as it appears in the Windows Port List, is the same as the Novell Print Server name, and may be changed by changing the Novell Print Server name using the Web-based management or MAP Program.

On power up, the NIC checks the network to see if there is Novell activity. If there is, it will use the same frame type and the local network number that it senses. If, in addition, the NIC can log on to a file server, it will assume that Novell is normally used and will store this frame type and new number in NVRAM so that, when it comes up again, it will not have to spend the time sensing (which can take some time). However, if the NIC cannot attach to a file server, it will use the sensed values, but will not store them.

If the NIC does not see any Novell activity, it will use 802.2 on 802.3 as a frame type and will assign itself a network number of 0. The frame type and network number being used is shown on the status report.

Note

- If a NIC is being moved from a site that had active Novell to a site that does not, the unit should be reset to the factory default to clear the frame type and network number information.

3.3.1 Installing the IPX Peer-to-Peer Printing Program

Use the following procedure for an automatic installation of the IPX Peer-to Peer printing Program. If the opening screen does not appear as described in step 1, follow the instructions for the manual installation procedure.

1. Insert the CD-ROM into your workstation's CD-ROM drive. The opening screen appears automatically.
2. Click the **CD-ROM Contents** button to display the **Introduction** screen.
3. Click **Installation/Configuration Programs** located at the bottom of the **Introduction** screen.
4. Select the program that you want to install and follow the instructions displayed on the screen.

You can use the following procedure to manually install the IPX Peer-to-Peer Printing program.

1. Insert the CD-ROM into your workstation's CD-ROM drive.
2. Run the program. (In this example, we assume that drive D: is your workstation's CD-ROM drive.)

 D:\Ipx-P2p\Setup.exe

3. Follow the instructions that appear on the screen.

Once the redirector is installed, each printer on the network that supports this Peer-to-Peer capability will appear as a Port under Printer. To use the Peer-to-Peer connection, create a logical printer using the driver installation program according to the instructions for your printer. Set up the printer as a LOCAL printer.

3.3.2 Installing the Printer Driver and Setting the Printer Port

1. Using the install program, install the printer driver that comes with the printer.
 Refer to the manual that came with the printer for details.
2. Open the **Properties** menu item of the printer icon.
3. Select the **Detail** tab.
4. Select the port that you want from the **Print to the following port** item.

3.4 Using a Web Browser

Once you have assigned an IP address to your NIC, you can use a Web browser such as Netscape Navigator or Microsoft Internet Explorer to access the NIC's onboard HTTP server. The HTTP server can be used to perform various maintenance procedures. See *Appendix C* of this manual for details.

Chapter 4

NetWare Configuration

Use this chapter if you will be printing from Novell NetWare. This chapter is divided into the following sections:

- **Configuring NetWare 2.15 and 3.x** describes how to configure the NIC for use with Versions 2.15 or 3.x. Use PCONSOLE to set up the print server function.
- **Configuring NetWare 4.x in Bindery Emulation** describes how to configure the NIC for use with Version 4.x —Bindery Services. Use PCONSOLE to set up the print server function.
- **Configuring Novell Directory Services** describes how to configure the NIC for use with Version 4.x Directory Services. Use NWADMIN to set up the print server function.
- **NIC Setup Parameters** describes the parameters accessible via MAP or a Web Browser used to configure the Print Server for NetWare.
- Using NetWare Utilities explains how to use standard Novell NetWare utilities to make changes to the configuration of the Print Server function.

4.1 Configuring NetWare 2.15 and 3.x

Before configuring NetWare, you must determine if the NIC has its desired name. Use MAP or a Web Browser to change the name if you want. Refer to section *3.1* for this setting.

The following steps are the general procedures for configuring the NIC, which require supervisor privileges. These steps are covered in detail in the following paragraphs:

1. Start PCONSOLE and select the file server you want to use.
2. Create the print queues.
3. Specify the NIC as a print server.
4. Configure the print server and printer.
5. Assign the print queues.
6. Set up the NOTIFY options.
7. Repeat the procedure for other file servers.

When you are finished, turn the printer off and on again. The printer creates a status report that indicates the file servers to which the unit is attached and the queues which it services.

Before you begin:

- Verify that you have supervisor privileges on the file servers on which the NIC print server is to be entered.
- Verify that your version of PCONSOLE is later than 1.0.

4.1.1 Start PCONSOLE and Select File Server

Follow these steps to start PCONSOLE:

1. Log in to the network, type **PCONSOLE** and press [Enter].
2. Choose **Change Current File Server** from the **Available Options** menu. This displays a list of file servers.
3. Select the file server on which you want to install the print server and press [Enter]. If the name of the file server you want is not displayed, press [Insert] to get a list of file servers.
4. Log in to the file server.
5. Press [Esc] to return to the Available Options menu.

4.1.2 Create Print Queues

The NIC must be assigned to at least one print queue on the file server.

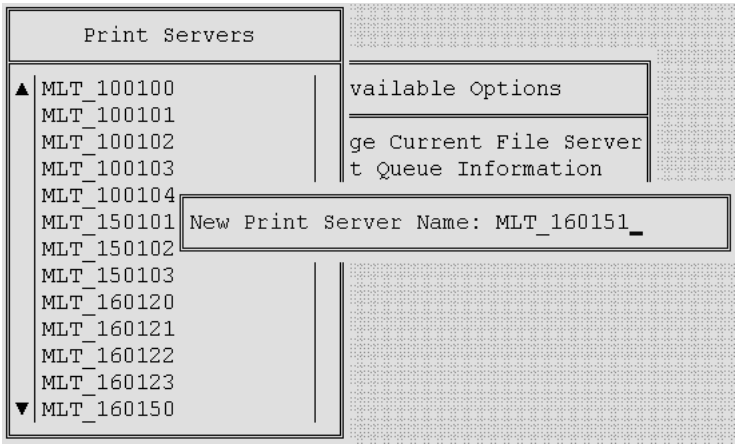
- If the print queue that you want the NIC to service already exists, and you know the name of this queue, go to *4.1.3 Enter the Print Server Name*.
- If you do not know the name of the queue, or it does not exist, use the following procedure:

1. Choose **Print Queue Information** from the **Available Options** menu, and press [Enter]. This displays a list of existing queues.
2. To create a new queue, press [Insert]. Type the name of the queue and press [Enter]. You do not need to enter any more information at this time.
3. Press [Esc] to return to the **Available Options** menu.

4.1.3 Enter the Print Server Name

A print server takes the print jobs from queues and sends them to the printer. Use this procedure to specify the name of the print server:

1. Choose **Print Server Information** from the **Available Options** menu, and press [Enter]. This displays a list of existing print servers.
2. press [Insert]. The New Print Server Name box is displayed.



3. Type the name of the print server into the entry box. The Novell print server name is printed under Novell NetWare information on the status report.

Note

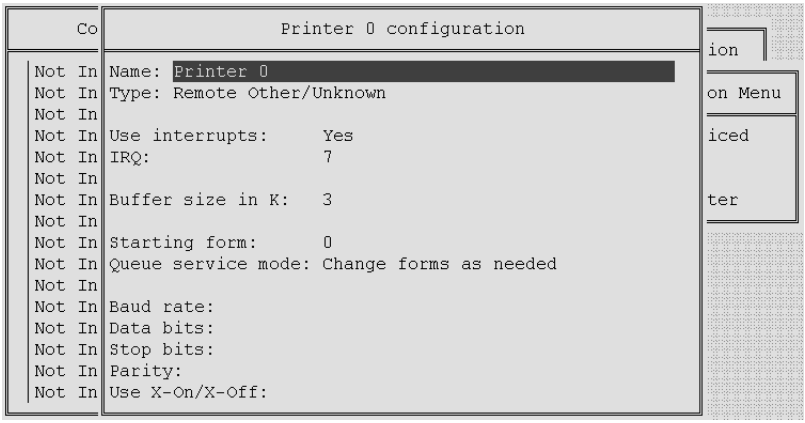
- If desired, this name can be changed using MAP or Web Browser. The screen example shows how to enter the print server name for a print server with a serial number of MLT_160151.

4. Press [Enter] to add the print server name to the Print Servers list.

4.1.4 Configure the Print Server

Use the following procedure to configure the Print Server's function:

1. Choose the print server name from the **Print Servers** list and press Enter.
 The **Print Server Information** menu appears.
2. Choose **Print Server Configuration** from the menu and press Enter.
3. Choose **Printer Configuration** from the menu and press Enter.
 This displays the **Configured Printers** menu. Since this is a new Print Server entry, all printers are labeled "Not Installed".
4. Choose the printer and press Enter. The **Printer 0 Configuration** screen appears with a title of Printer 0, as shown in the following example.



5. If you choose to, change the default in the Name field on this form to MFP or something else that helps you identify the printer. The print server uses this name in its message back to the users on the Notify list. Select **Name**, enter a name, and then press Enter.
6. Select **Type** and press Enter. This displays a list of printer types. Choose **Remote Other/Unknown** and press Enter. This creates default entries in the other fields. These defaults are usually optimal, so do not change them without specific knowledge of the effects.
7. Press Esc. At the prompt, choose to save your changes.

8. Press [Esc] to return to the **Print Server Configuration** menu.

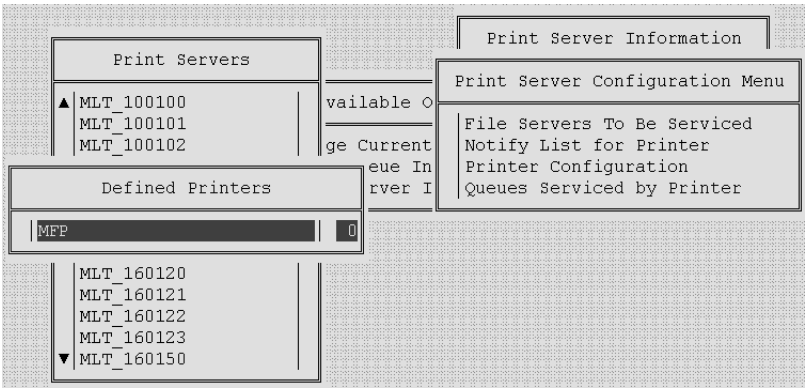
4.1.5 Assign Print Queues to the Printer

When you assign queues to the defined printer, you authorize the print server to service these queues.

Note

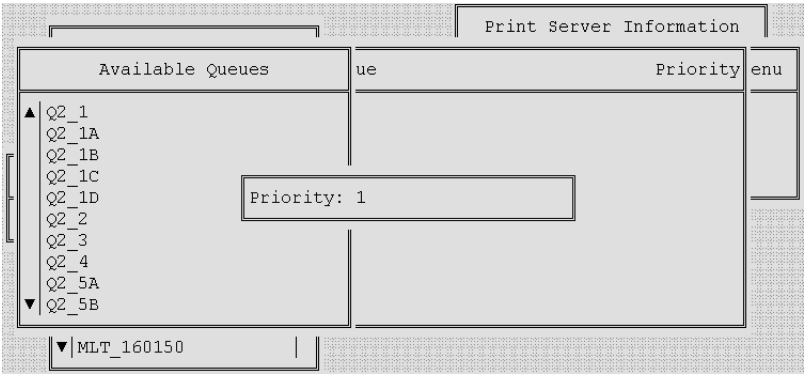
- Do not assign the same queue to two different print servers. If a queue is assigned to multiple print servers, print jobs may not go to the intended printer.

1. Choose **Queues Serviced By Printer** from the Print Server Configuration menu.



2. Select the printer name from the list of defined printers.
3. Press [Insert] to display the **Available Queues** list for the printer.

4. Select the queue you want and then assign a priority level from 1 to 10. It is recommended that you accept the default priority level. Press Enter. The queue appears on the list for the printer.



 Press Insert again to assign additional queues.
5. When you finish assigning queues, press Esc and then save your changes. Continue to press Esc to return to the **Print Server Configuration** menu. If you want to set Notify options, go to Section. *4.1.6*. If you are finished, continue to press Esc and then save your changes.

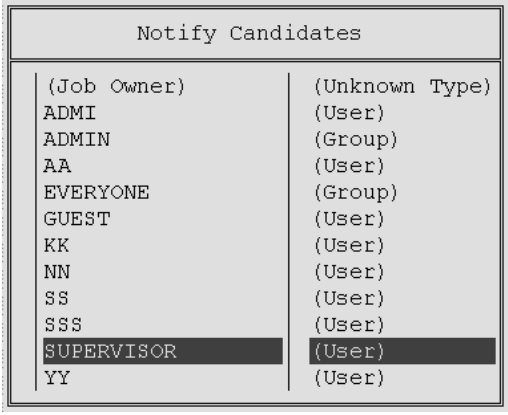
4.1.6 Set Up Notify Options for the Printer (Optional)

To enable the print server to notify users or user groups if a problem occurs with the printer, set up the Notify options. The print server supports the enhanced NOTIFY options for printers, including informing users when the printer:

- Is off-line, jammed, opened, or out of paper
- Requires a manual paper feed or a form change
- Has had an engine failure

1. Choose **Notify List for Printer** on the Print Server Configuration menu.

2. Select the printer from the **Defined Printers** list. Press [Insert] to view a list of **Notify Candidates**.
3. Select the user or group from the list.



4. Set the **First** and **Next** intervals in the **Notify Intervals** screen. It is recommended that you use the defaults. The **First** interval is the number of seconds the network waits before it notifies candidates about a print job problem. The **Next** interval specifies how often in seconds candidates are notified. Enter a number for each interval and press [Enter].
5. Press [Esc] and then choose **Save Changes**. Press [Esc] at each screen until you reach the Print Server Configuration menu. After you have finished the configuration, press [Esc] and then save the changes.

4.1.7 Installing the Print Server on Multiple File Servers

To install the print server on more than one file server, perform the procedures described in Sections *4.1.1* through *4.1.6* for each file server. You must use the same name and password for the print server (or no password) on all file servers. You set the password for the NIC using the MAP or a Web Browser (refer to *4.3 Configuring the NIC in Novell Directory Services*). If you use a password, specify it on each file server using the **Change Password** option on the Print Server Information menu of the PCONSOLE utility.

When the NIC comes up, it automatically searches for and attaches to the file servers that are no more than four hops and have no more than eight ticks propagation delay. For extremely large or complex networks, this allows a bounded search time on start-up. If the print server must attach to file servers beyond this range, or, if you wish to accelerate start-up by eliminating the need to search all file servers in the four hops/eight ticks radius, the file servers with which the print server is to operate may be entered into the Print Server Configuration of a “primary” file server. The primary file server can be any file server within the four hops/eight ticks propagation time limits, but ideally is as close as possible to the print server. Once the print server locates the primary file server and the list of file servers to be serviced, the automatic search is dropped and the print server will go directly to those file servers listed (and to no others).

4.1.8 Primary File Server

To use the primary file server option, use the following procedure on a file server close to the printer:

1. List the file servers to be serviced by the primary file server by selecting **File Server To Be Serviced** option from the **Print Server Configuration Menu**.
2. Press [Insert] to display the Available File Servers list.
3. Select the name if each file server to be serviced and press [Enter] to add it to the **File Servers To Be Serviced** list.
4. When the list is complete, press [Esc] to return to the menu.
5. Install the NIC on each of the primary file servers.

4.1.9 Preferred File Servers

The Management Access Program MAP or Web Browser allow you to identify a “preferred” file server, to be identified within the NIC itself. If a preferred file server is listed, the NIC will attach to this identified file server instead of initiating the automatic search. If the preferred file server is also a primary file server (for example, has file servers listed under file servers to be serviced), the NIC will connect directly to these file servers.

Note

- The Preferred File Server is only applicable to bindery-based queues. Entering it has no affect on NDS queues.

4.2 Configuring NetWare 4.x — Bindery Emulation

Novell's NetWare 4.x can operate in two modes — Novell Directory Services (NDS) and Bindery Services Emulation. For Directory Services, see *4.3 Configuring the NIC in Novell Directory Services*. These services run simultaneously and transparently to each other. The NIC may be configured to operate with Bindery Services mode only (this section), or to operate under NDS (*4.3 Configuring the NIC in Novell Directory Services*). When configured under NDS, the NIC will also service older file servers operating in bindery mode.

Note

- If the NIC is not properly set up for NDS and the Bindery Services mode is not running, the NIC can not find its file servers, and the status report indicates the Novell NetWare protocol is not active.

4.2.1 Confirm Bindery Context

Before installing the NIC on a Novell NetWare 4.x server in Bindery Emulation mode, check that the server has a Bindery Context (name for the server under Bindery Services mode). If the server does not have Bindery Context, it may be preferable to install in NDS mode. If the NIC must be installed in the Bindery Emulation mode, the server must have Bindery Context. Perform the following steps to confirm the server has Bindery Context:

1. Go to the 4.x server and at the system console type: **load install**
2. Select **Maintenance/Selective Install** from the menu.
3. Select **NCF Files Options** from the menu.
4. Select **Edit AUTOEXEC.NCF** from the menu.
5. Search the file to see if you have a statement similar to the following included:
 SET BINDERY CONTEXT=OU=ENG
 Where **=OU=ENG** is an example of a name for the file server context. Use your own file server context in place of **=OU=ENG**.
6. At the console prompt, type the **SET BINDERY CONTEXT** statement that you entered in the autoexec.ncf file.

Note

- The command at the console prompt takes effect immediately. The definition in the autoexec.ncf file takes effect when the server is shut down and then restarted.

4.2.2 Configure in Bindery Mode with PCONSOLE

Once you confirm the server has Bindery Context, use the following procedure to configure the NIC.

1. Log into the network as ADMIN.
2. Type **PCONSOLE** and press Enter. The following screen appears.

Available Options
Print Queues
Printers
Print Drivers
Quick Setup
Change Context

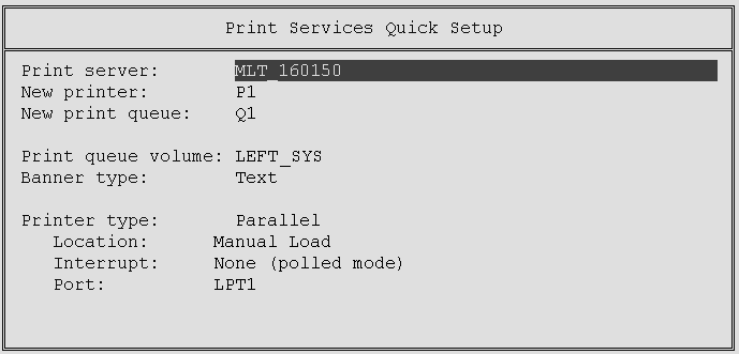
3. When the **Available Options** menu appears, press F4 (for the Bindery Mode).

Note

- If you receive a message asking you to login to a server with Bindery connections, the server you are attached to does not have Bindery Mode enabled. Follow the procedures in *4.2.1 Confirm Bindery Context* or log onto a server with Bindery Services activated.

4. From the **Available Options** screen, select **Quick Setup** and press Enter.

Use **Quick Setup** to connect your print server, print queue and printer correctly. You can modify these later if you need to.



5. Select **Print server** and press [F3] to modify the entry.
6. Type the name of the print server in the **Print server** field and press [Enter].

Note

- The print server name is printed under the Novell Network Information on the status report. The factory default name is **MLT_<serial number>**.

7. Press [↓] to move to the **New printer** field. Type a name and press [Enter].
8. Press [↓] to move to the **New print queue** field. Type a name and press [Enter].
9. Press [↓] to move to the **Printer type** field and press [Enter]. From the list of printer types, select **Other/Unknown** and press [Enter].
10. When you are finished, press [F10] to save the configuration. Repeat steps 5 through 10 for each file server that the printer server services.
11. To view, add, delete, or modify print servers or queues after the initial setup, select either the **Print Queues** or **Print Servers** option on the **Available Options** screen.

4.3 Configuring the NIC in Novell Directory Services

Novell Directory Services (NDS) offers a different, more advanced approach to network management than previous NetWare versions. Generally, it stores and tracks all network objects. As a rule, all 4.x servers must have NDS loaded in order to function. In this way, every NetWare 4.x server is a Directory server, because it services named Directory objects such as printers, print servers and print queues. With the appropriate privileges, you can create a print server object, which, once configured in its context (or location) on the network, eliminates the cumbersome setup of print servers on every network server. NDS provides true enterprise networking based on a shared network database rather than a individually defined physical sites. The result is greatly improved print server setup and management.

The Directory Information Base (DIB) is used to store information about servers and services, users, printers, gateways, etc. It is a distributed database, allowing access to data anywhere on the network wherever it is stored. Pre-4.x NetWare versions provide the same data found in the DIB but the data is stored in the NetWare Bindery. The DIB was designed with more flexible access, more specific security, and, since it is distributed, it was designed to be partitioned. The Directory uses an object-oriented structure rather than the flat-file structure of the Bindery, and offers network-oriented access, rather than server-oriented access found in the Bindery.

The Directory is backward-compatible with the NetWare Bindery through Bindery emulation mode. Section *4.2* describes Print Server Operation with a 4.x NetWare system in bindery emulation mode. When Bindery emulation is enabled, Directory Services will accept Bindery requests and respond just as if a Bindery existed on the NetWare server being accessed. Be aware that information obtained from the Bindery query may not be stored in the server since the Directory is a partitioned and distributed database. Even though the NetWare 4.x server is not operating from a Bindery, the applications making Bindery requests will not know the difference.

You may use NWADMIN to configure the printer in NDS. Prior to printing, NDS must be set up as follows and the NIC must be set up with NDS Context and Tree. See *Section 4.4.* The steps below describe the use of NWADMIN configuration to create printer, print server, and print queue objects. Then, you will assign, or associate those objects with each other. If you wish to keep Bindery resources on any server, you can under NetWare 4.x if you declare a SET statement in your **AUTOEXEC.NCF** file.

For those who prefer, NetWare does offer PCONSOLE as an alternative to NWADMIN. PCONSOLE can be used to set up static information about print servers such as: which queues to service, and whom to notify in the event of a problem. See *Novell NetWare documentation* for more information about the use of PCONSOLE for NDS.

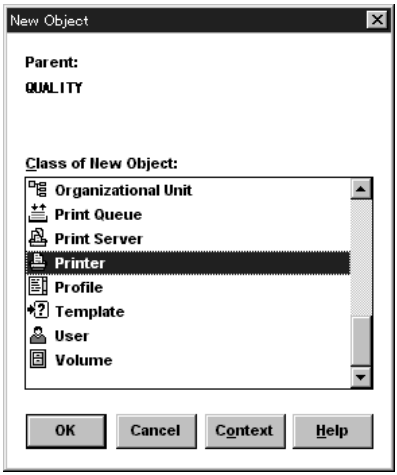
4.3.1 Create Printer Object

1. Click on the **NWADMIN** icon in the NetWare Tools group in Windows. The NetWare Administrator window will appear. To bring up your Directory Tree, open a Browser window by clicking on the **Tools** menu item and, the **Browse** item.
2. Highlight the Organizational Unit or Organization where you want to create the print service in the Directory Tree, select the **Object** item from the main menu and choose **Create...**

Note

- If you wish, you can create objects another way in NWADMIN by: selecting an Organizational Unit, clicking on the right mouse button (which produces a pop-up menu), and clicking on **Create...** use the left mouse button to bring up the **New Object** window). From this point, the procedure continues as described.

3. When the New Object window appears, scroll down the **Class of New Object** icon list, select the Printer icon and click on the **OK** button.



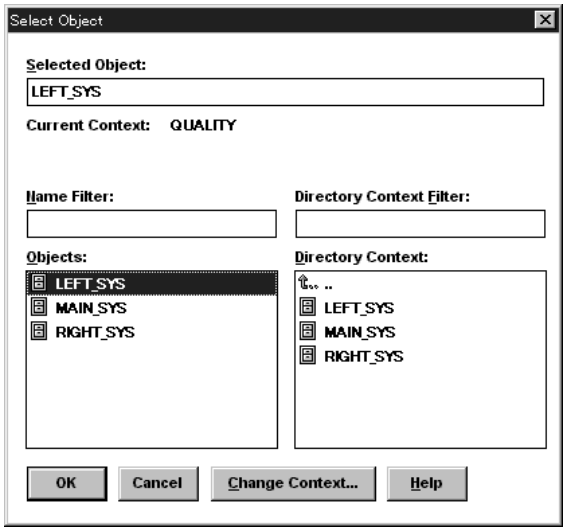
4. When the Create Printer window appears, type a value in the **Printer Name** field and click on the **Create** button.

4.3.2 Create Print Server Object

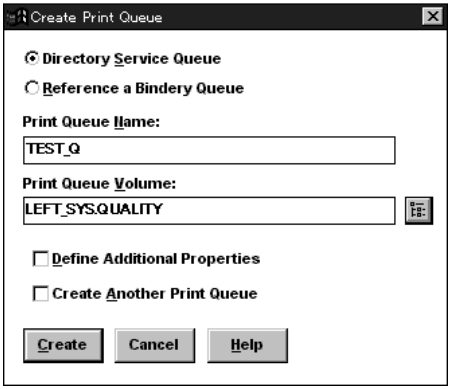
1. Again, highlight the Organizational Unit, select the **Object** item from the menu and choose **Create...**
2. At the New Object window, scroll down the **Class of New Object** icon list, select the Print Server icon, and click on the **OK** button.
3. At the Create Print Server window, type a value in the **Print Server Name** field and click on the **Create** button.

4.3.3 Create Print Queue Object

1. Once again, highlight the Organizational Unit, select the **Object** item from the menu and choose **Create**...
2. At the **New Object** window, scroll down the **Class of New Object** icon list, select the Print Queue icon, and click on the **OK** button.
3. At the **Create Print Queue** screen, click on the **Directory Service Queue** button, then type in values for **Print Queue Name** and **Print Queue Volume** and click on the **Create** button. If you don't know the **Print Queue Volume** name (the hard drive you will be accessing), click on the icon to the right of the volume field. The **Select Object** window will appear with the volume listed in **Objects**. If the volume is not listed, scroll the **Directory Context** items until you find the volume where you want the queue to reside.

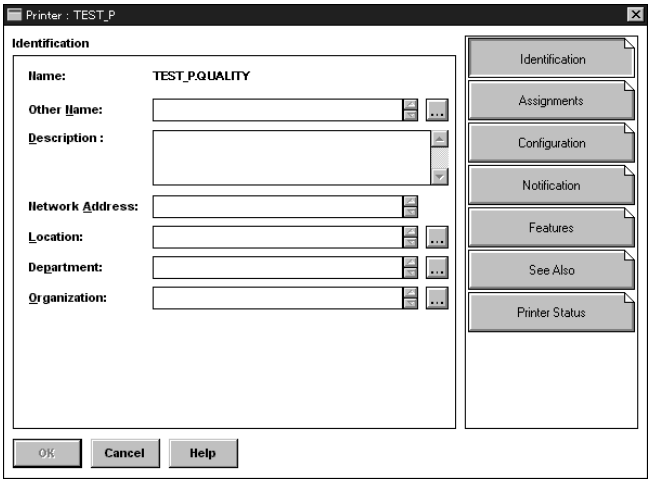


Click on the object (hard drive) of your choice and it will appear in the **Selected Object**: field. Click on the **OK** button. The full volume will now appear in the **Print Queue Volume** field. Finally, click on the **Create** button.

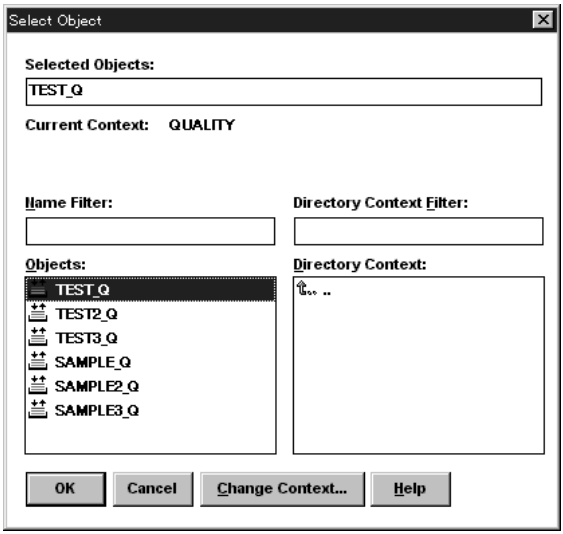


4.3.4 Assign Printer Object

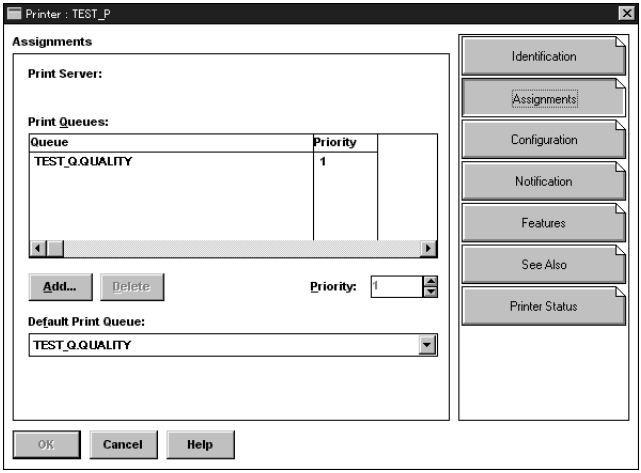
1. Go to the **Directory Tree**. Double click on the printer object just created and bring up the **Printer** window. See below. Find the **Assignments** button on the right-side of the window and click on the **Add** button.



2. When the **Select Object** window appears, find the print queue object just created among the choices listed in the **Objects** box and select it.

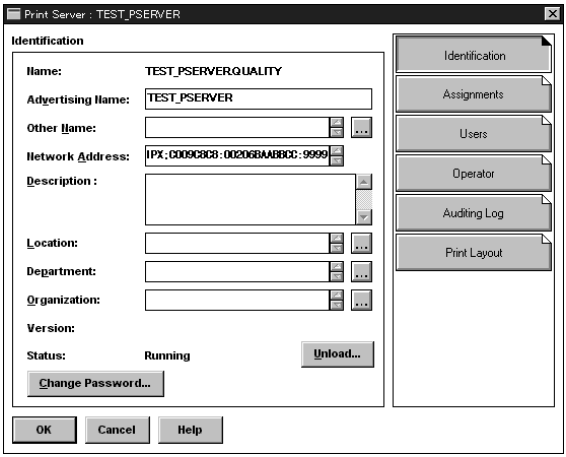


Click on the **OK** button and the print queue just created is added to the **Print Queues**: box in the Printer: window. Click on the **OK** button again.

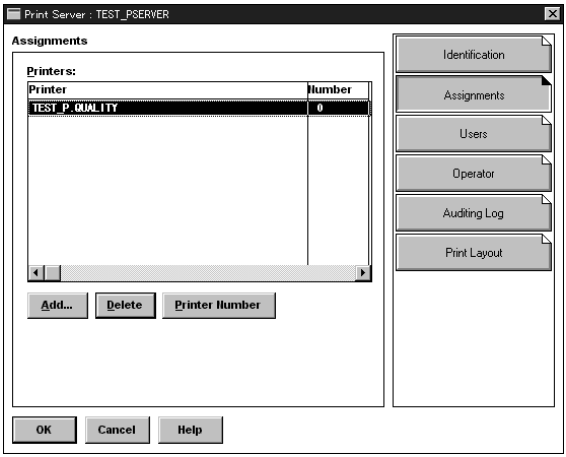


4.3.5 Assign Print Server Object

1. At the **Directory Tree**, double click on the print server object you just created and bring up the **Print Server** window.

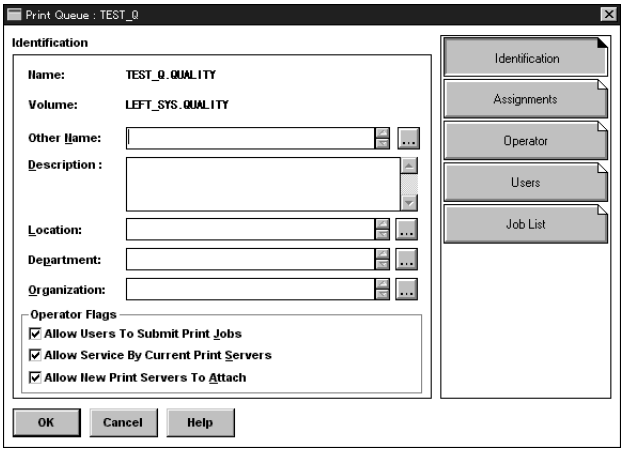


2. At the **Print Server**: window, click on the **Assignments** button and **Add** button to bring up the **Select Object** window. Select the printer object just created from the **Objects**: box and click on the **OK** button. Now the printer (with its context) appears in the **Printers**: box of the **Print Server** window. Click on the **OK** button.

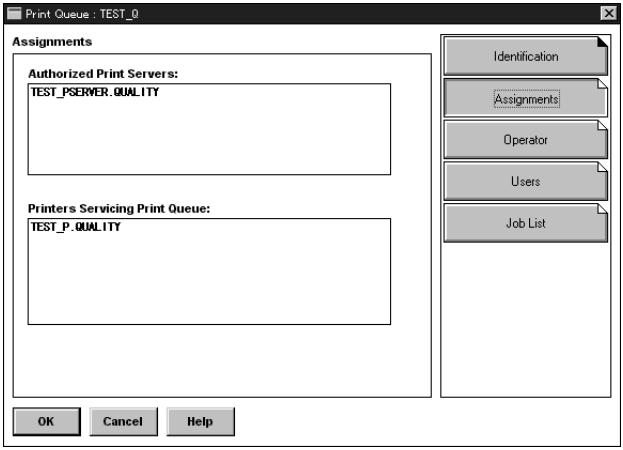


4.3.6 Check Assignments

At the **Directory Tree**, double click on the **Print Queue** object you just created. At the **Print Queue** window, click on the **Assignments** button.



If you configured the print queue and printer correctly they will appear in the proper boxes on the **Print Queue** window. Press the **Cancel** button.



4.3.7 Set Up and Reset the Printer

NWADMIN configuration is complete. Before you can begin printing, though, be sure to set up and reset (power cycle) the printer.

4.4 NIC Configuration

The MAP or a Web Browser must be used to define the context and tree of the Print Server. It is also used to change the Print Server name, set in a password, modify scan and frame search parameters, and sent in bindery-mode specific values.

Use the MAP or Web Browser (refer to Chapter 3) to access the Setup pages of the NIC. Once you have accessed the Network Setting pages or the Main Menu, do the following:

1. Select **Setup NetWare** under Protocols.
2. Click on **Enable NetWare**. If it is not selected, the NetWare protocols will not come up, the NIC will not appear as an advertised device, and the NIC will not be accessible using IPX SNMP.
3. The default name for the NetWare Print Server is MLT_123456, 123456 is the serial number of the NIC. This is also the name of the printer in peer-to-peer mode. If you want to change the default Print Server name, type this name in the **Print Server Name** space. Leave the space blank if the default name is to be used.
4. If you want the NIC login with a password, this password may be entered in the **Print Server Password** field, and again in the **Password Retype** field. If a password is used, this password must be the same password for all bindery-based and NDS-based Print Server entries.
5. Type the name of a preferred bindery-based file server in the **Preferred File Server** field. The Preferred File Server entry is significant only for bindery or bindery emulation based operations. Refer to *4.1.9 Preferred File Servers* for the significance of a Preferred File Server. The Print Server must be configures on the Preferred File Server. Incorrect setup of a Preferred File Server can interfere with NetWare printing.

6. If the Print Server is to be operated under Novell Directory Services, type in a **Context** entry and **Preferred NDS Tree** entry in the appropriate fields. Be sure to give the whole context, whether typed or typeless, and do not begin your context path with a trailing period (.). If you don't know your tree, type: whoami at the DOS command line. A typed context name example is:

 ou=standard.ou=organization_1

7. In the default mode, the Print Server scans each queue which it is to service once per second. If you prefer a longer scan rate, you may enter the time between scans in seconds in the **Print Queue Scan Rate** field.
8. The NIC will normally monitor the network to determine which frame type is being used for NetWare. When it recognizes a type, it will assume the same frame type. Once it selects a frame type, the NIC will only operate over that NetWare frame type. Monitoring normally starts looking for IEEE 802.3, then Ethernet II, then 802.3 SNAP, etc. If your network is using multiple frame types for NetWare, you should bias the frame search to the desired type by setting the button next to the designation under **Ethernet Frame Type**.
9. You can **Disable Bindery** mode on the Print Server if you are operating in NDS mode only. To do so, click on that box. If you disable Bindery, the NIC will not support Print Servers on a Bindery file server.
10. Once you have selected all desired settings and entered the desired NetWare information, you may cause this information to be entered in the NIC NVRAM by clicking on **Accept Settings**. As with all value changes, if you have not entered the NIC Management Password before, you must enter it in the appropriate space before clicking on **Accept Settings**.
11. Entered values do not take effect until the NIC is reset or power cycled. You may reset from MAP or the Web Browser by returning to the Network Settings page, and click on **Reset** under **System**. Now click on **Reset Unit**. Alternatively, you may power cycle the printer. The new NetWare values should now be in effect.

4.5 Using the Novell PCONSOLE Utility

This section explains how to use the PCONSOLE utility to perform the following tasks:

- Attach and select a file server
- Select or delete queues for the print server
- Set-up the Notify function

See the NetWare Print Server Manual for detailed information on this utility.

Note

- You must have Supervisor privileges to perform many PCONSOLE operations.

4.5.1 Changing the File Server

You can specify a file server as the current one. To change the file server, use the following procedure:

1. Log into the current file server and start the PCONSOLE utility.
2. Select **Change Current File Server** from the **Available Options** menu.
3. Press [Insert] to display the available file servers.
4. Select the file server you want as the current one and press [Enter].
5. Type your username and press [Enter]. If the username requires a password, the Password screen is displayed. Type the password and press [Enter].
6. Select **Change Current File Server** from the **Available Options** menu. A list of the attached file servers is displayed.
7. Select the current file server from the **File Server/Username** screen.

4.5.2 Changing Print Queues

When you print a file, your system sends the file to a print queue. The print server assigned to that queue extracts the print job and sends it to the assigned printer. If a print server is servicing queues on multiple file servers, you must assign queues to the printer on each file server. To change the print queues, use the following procedure:

1. Start the PCONSOLE utility.
2. Select **Print Server Information** from the **Available Options** menu.
3. Select the print server from the list.
4. Select **Print Server Configuration** from the menu.
5. Select **Queues Serviced by Printer** from the menu.
6. Select a printer from the **Defined Printers** list.
7. Press [Insert] at the **File Server/Queue/Priority** screen. The **Available Queues** list appears.
8. Select a queue from the list.
9. Press [Enter] at the **Priority** screen to leave the priority setting at 1. The highest priority is 1; 10 is the last. To change the priority of a queue, press [Enter] at the **File Server/Queue/Priority** screen to display the **Priority** setting screen. Press [←] to delete the current setting. Type a new number from 1 to 10 and press [Enter].
 Repeat steps 7, 8, and 9 to assign additional queues to the printer.
10. Press [Esc] and save all changes.

4.5.3 How to Set Up Notify

You can specify users or groups of users that are notified if a problem occurs when a print job is sent to the printer. If the print server is servicing queues on multiple file servers, you must set up a NOTIFY list for each file server. To set up NOTIFY, use the following procedure:

1. Start the PCONSOLE utility.
2. Select **Print Server Information** from the **Available Options** menu.
3. Select the print server from the menu.
4. Select **Print Server Configuration** from the menu.

5. Select **Notify List for Printer** from the menu.
6. Select the printer from the **Defined Printers** menu.
7. Press Esc at the **File Server/Notify Name/Notify Type/First/ Next** screen. The **Notify Candidates** screen appears.
8. Select the user or user group from the **Notify Candidates** screen. The **Notify Intervals** screen displays.
9. Set the **First** and **Next** intervals for notifying users about printer problems. The First interval is the number of seconds the network waits before it notifies users about a print job problem. The Next interval specifies how often in seconds users are notified. Enter a number for each interval and press Enter.
10. Press Esc and save all changes.
11. Press Esc until you see the prompt to exit PCONSOLE. Select **Yes** and then press Enter.

Chapter 5

AppleTalk Configuration

Use this chapter if you will be printing from a Macintosh. This chapter explains how to configure the NIC using AppleTalk and how to use the AppleTalk NIManage utility program.

Note

- The printer must be equipped with the PS option when operating in an AppleTalk environment.

5.1 Choosing the Printer

To choose the printer, use the following procedure:

1. Make sure you have loaded the printer driver appropriate to your printer.
2. Select the AppleTalk link for AppleTalk by clicking on the Apple icon in the Macintosh menu bar.
3. Select **Control Panel**.
4. Click on **Apple Talk**.
5. Choose **AppleTalk** as the AppleTalk connection.
6. Click on the Apple menu.
7. Select **Chooser** to display the Chooser screen.

Note

- The Chooser screen will not show AppleTalk zones if your network does not have more than one zone.

8. Select the AppleTalk Zone containing the printer from the list at the lower left of the screen. Select the device driver type corresponding to your printer from those indicated at the upper left of the screen. A list of printers will appear in the display panel at the right of the screen.
9. From the display panel at the right of the screen, choose the name of the printer from the list of printers. The AppleTalk printer name for your printer is printed out on the status report under AppleTalk Connection Information.

10. The options available at this point depend on your printer driver. With a typical driver, you may select **SETUP**. Then select **AUTO SETUP**. There will be a series of messages as the Chooser communicates with the printer and locates the proper PPD. The setup screen will return, listing the PPD file selected. Select **OK**. Then exit from Chooser.

5.2 Loading the AppleTalk NIManage Utility Program

The AppleTalk NIManage utility program has the following functions:

- View the names of the printer or printer zone.
- Enable or disable the status report.
- View the error log.
- Enable or disable other protocols and view or modify the TCP/IP address, subnet mask, and default gateway address.

Use the following procedure to get access to AppleTalk NIManage utility program:

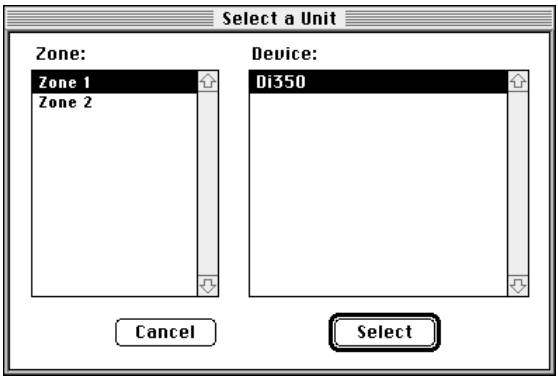
1. Insert the CD-ROM into the CD-ROM drive.
2. Double-click the **NIC mac** icon from the CD-ROM.
3. Click the **CD-ROM Contents** button to display the Introduction screen.
4. Click **Installation/Configuration Program** located at the bottom of the Introduction screen.
5. Select the **NIManage AppleTalk Administration Program** item to start the NIManage program. The Zone and Device screen is displayed.

You can use the following procedure to start the NIManage program instead of step 1 to 5 above.

- Insert the CD-ROM into the CD-ROM drive, and double-click the APPLTLK folder from the CD-ROM. Double-click the **NIManage** icon



- The Zone and Device screen appears on the display.



Note

- If you have one zone, the above screen will not appear.

6. From the Device display panel, select the NIC. After you select the device, a menu of options is added to the menu bar at the top of your screen.

5.3 Configuring the NIC

You use the options added to the menu bar to configure the print server. Depending on your printer, certain operations may not be available. These functions will be “grayed” out and cannot be selected.

5.3.1 Configuration

Use the Configuration function to change the names of the device and AppleTalk Zone.

5.3.2 Error Log

The Error Log function is used to view a log of events that the NIC has registered. The log contains information as well as errors. Customer Support may need the information on this screen if your NIC encounters problems.
Choosing this function displays a screen containing the text of the log. You can print the error log contents by using the Print option under the File menu. To save the contents of the error log, do one of the following:

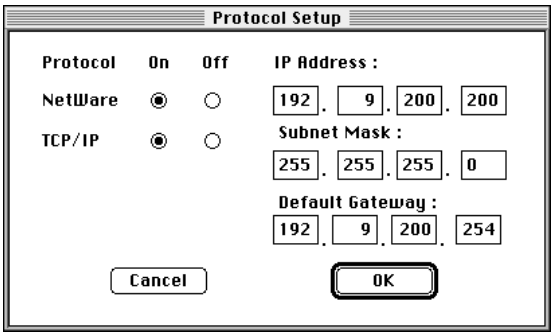
- Use the **Save As** option from the File menu to save the entire log file.
- Use the **Edit** option to cut, copy, and paste some or all of the log file.

Note

- This does not enter data into the error log itself. The data is cleared each time the printer is power cycled.

5.3.3 Protocol Setup

Use the Protocol Setup option to configure network protocols other than AppleTalk. Selecting the Protocol Setup function displays the following screen:



Note

- The default values for the IP address and Subnet Mask are shown as zeros. However, this represents a “no IP address” condition, not an IP address.

1. Click the protocols to **On** if you want them to be active. Click those protocols that you do not want to use to **Off**. The utility will not let you make active any protocol that the NIC does not support or cannot handle because of active protocol limitations.
2. Type the IP address and subnet mask if you have enabled TCP/IP. Type the default gateway address, if you have one.
3. Click on **OK** when you have finished using this screen.
4. You must power the printer off and on to make the changes take effect.

5.3.4 Options

Click on **Status Sheets: Enable** to send a status report to the printer each time you power it on, or click on **Disable** to disable this option. Click on **OK**. The change takes effect the next time you power on the printer.

MEMO

Chapter 6

TCP/IP Configuration

This chapter explains how to configure the NIC and your network for use with TCP/IP communication in various environments. Independent setup and installation procedures are provided for Windows systems and for most popular UNIX systems. The NIC TCP/IP capability will also operate with lpr spoolers on other systems, and with spooler/ supervisor capabilities that communicate raw print jobs to the Print Server TCP/IP Port. This port number defaults to 10001, but may be changed to any desired number using the Telnet utility, SNMP, or the HTML pages accessible via MAP or a Web Browser. Section *6.3 Running Telnet*, describes the interactive setup capability accessible through the Telnet utility on any TCP/IP platform, and is equally applicable to Windows, UNIX, and other TCP/IP environments. The use of MAP or a Web Browser to access Web pages in the NIC is described in *Chapter 3*.

6.1 Installation in a Windows Environment

The several versions and variations of Microsoft Windows may be used on a NetWare and/or TCP/IP networks, as well as in a native Microsoft Windows network. This flexibility allows various options for setting up the network printing system even though this NIC does not support NetBEUI. If the Windows workstations are connected to a NetWare network, configure the printer interfaces for NetWare, and use standard Windows/NetWare utilities to provide access to the printer. If NetWare is not to be used, the users may access the printer using TCP/IP. Windows 95 and Windows NT4.0 users can also use the NIC Peer-to-Peer capability as described in *Chapter 3*. The following sections describe installation using TCP/IP under Windows for Workgroups, Windows 95, and Windows NT.

Note

- See the documentation that comes with Windows for details about installing TCP/IP on each workstation.
- Printing with TCP/IP requires that the workstation have TCP/IP capability and the corresponding spooler, lpr; or that the workstation can share an lpr queue on a Windows NT server (for example) that has one. In general, if printers are not shared, an lpr queue must be created on each workstation from which printing is initiated. See the Windows documentation about sharing printers.

Windows for Workgroups

Windows for Workgroups does not normally come with TCP/IP. However, various TCP/IP facilities are available for Windows for Workgroups workstations, including a free TCP/ IP provided by Microsoft. There are third party lpr spoolers available. The following instructions are based on the Microsoft TCP/IP and a shareware lpr application that is available from various sources. You will need the files **WFWTCP32.zip** and **WFWTCP32.txt** for the TCP/IP, and **Windows lpr Spooler Version 4.1** (**wlprs41.zip** and **wlprspl.txt**) for the lpr.

See the file named **wlprspl.txt** for details about installing **Windows lpr Spooler Version 4.1**.

If you wish to use the BOOTP, you also need the **BOOTPL16.exe** file provided with this NIC.

Windows 95

Windows 95 comes with a TCP/IP stack. To print with this protocol, a client also requires an lpr utility. This program is available from various sources. The lpr queue can be created on each workstation or the lpr queue can be created on one workstation and shared on the network. Windows 95 workstations can also share an lpr printer installed on a Windows NT server on the network.

The following instructions are based on the a shareware lpr application that is available from various sources. You will need the

Windows lpr Spooler Version 4.1 (**wlprs41.zip** and **wlprspl.txt**) for the lpr.

See the file named **wlprspl.txt** for details about installing **Windows lpr Spooler Version 4.1**.

If you wish to use the BOOTP, you also need the **BOOTPL32.exe** file provided with this NIC.

Windows NT

Windows NT (version 3.5 or higher) does come with TCP/IP and lpr capabilities, although these must be installed when the unit is configured. You must install the TCP/IP Protocol, Simple TCP/IP Services, and Microsoft TCP/IP Printing prior to entering the network printer on the workstation.

If you wish to use the BOOTP, you also need the **BOOTPL32.exe** file provided with this NIC.

Note

- Once you have lpr installed on an Windows NT Server workstation and have allowed printer sharing, other workstations may use the printer through the Microsoft Windows Network without having to have separate lpr queues installed on each workstation.

6.1.1 Setting up the NIC

The NIC must be given IP address and routing information to be used with TCP/IP. This can be done with MAP if you have a NetWare connection on your network, or with AppleTalk NIManage for Macintosh utility program if there is an Apple Macintosh on the network. Follow the instructions for these programs which are documented elsewhere in this manual. If you cannot use these programs, you can use either the ARP procedure or the BOOTP.

Prior to running these programs, install the NIC in your printer.

Power-up the printer. Keep the status report handy for the Ethernet MAC Address. It should show that TCP/IP is enabled, but that the IP address is not configured. If the unit already has an IP address, these procedures will not work. However, you can Telnet to the unit or use the Web pages accessed by MAP or a Web Browser to change the IP parameters.

6.1.2 Assigning IP Address with arp & ping

The NIC must be on the same network segment as the workstation that you are using to configure it. The TCP/IP stack must be installed and operating.

See *6.1.3 Assigning the IP Address with BOOTP* for details on using BOOTP instead of ARP to assign IP addresses.

1. From Windows, enter the MS-DOS box.
2. At the command prompt type:

```
>ping <any valid IP address on your network
- not the NIC>
```

The identified unit should reply.

```
>arp -s <NIC IP address> <NIC MAC Address>
```

The entry should be accepted.

For example:

```
>arp -s 192.9.200.200 00-20-6b-aa-bb-cc
```

```
>ping <NIC IP address>
```

Request should time out.

For example:

```
>ping 192.9.200.200
```

3. Recycle the power on the printer, or let the NIC reset itself. The NIC will produce a status report that should include the entered IP address.
4. When the NIC is up again, type the following at the command prompt:

   ```
   >ping <NIC IP address>
   ```

 (continue until you get a reply)

Note

- This only enters the IP address; you must use the Telnet facility or the Web pages accessed by MAP or a Web Browser to complete the IP setup for networks where subnets are used. See *6.3 Running Telnet*, for instructions on how to enter the other IP parameters.

6.1.3 Assigning the IP Address with BOOTP

BOOTP programs use the BOOTP protocol. The NIC must be on the same network segment as the workstation that you are using to configure it. The TCP/IP stack must be installed and operating. The BOOTP program will not work in a Windows PC Operating as a DHCP Server.

The BOOTP program you should use depends on the version of Windows on the workstation.

BOOTPL16.exe Work with a 16 Bit TCP/IP Stack (Windows For Workgroup).

BOOTPL32.exe Work with a 32 Bit TCP/IP Stack (Windows NT & Windows 95).

BOOTP programs are located on the CD-ROM in the directory named **bootp**.

5. Copy **BOOTPL16.exe** or **BOOTPL32.exe** into a directory on your workstation's hard disk.
6. Reset the printer.

Note

- The NIC issues the BOOTP request for a finite period of time. The NIC must be freshly reset for this program to work.

7. Run the program.
8. Pull down the Admin menu to Configure option.
9. Enter the IP address that you want to assign to the NIC, its Subnet Mask (make sure it matches what you are using on your subnet), the Default gateway (your router's IP address), and the MAC Address of the NIC (listed on the status report as MAC Address). Use colons as delimiters as shown on the status report rather than the dashes that Windows uses.
10. Click on **Go**. You will get a message that the program is Verifying, and then it will tell you whether the unit is active or not.
11. Wait for about five minutes for the NIC to reset. The newly entered IP information should be shown on the status report.
12. Enter the MS-DOS box. At the command prompt type:

    ```
    >ping <NIC IP address>
    ```

 (continue until you get a reply)

 If it does not respond, verify that TCP/IP is enabled on the status report. If the status report does not show the IP information, then repeat the above procedures.

6.1.4 Setting Up IP and lpr Parameters

The NIC provides for a setup connection via the standard Telnet port. To be able to make changes to a unit with factory default settings, you must logon as **"sysadm"**. The default password is also **"sysadm"** (This password can be changed from the Telnet utility). Section *6.3 Running Telnet*, describes the use of the Telnet utility.

1. Telnet to the NIC (the login and password are both sysadm).
2. Turn off the protocols that you are not utilizing (option 3).
3. Setup the subnet mask and default gateway for the NIC if applicable (option 1). (If you used BOOTP, this will already have been done).
4. Exit, Save and Reset the NIC

You can also use the HTML pages accessible via MAP or a Web Browser to setup lpr. The password to change parameters with the Web pages is the same as the Telnet password.

6.1.5 Creating an lpr Queue on the Workstation

The method for setting up lpr queue depends on the Windows version running on the workstation. Confirm the Windows version on the workstation and use one of the setup procedures below.

Windows for Workgroup

Once you install the spooler onto the workstation, the setup program will create a group and icon.

1. Double click on the **spooler** icon.
2. Click on **setup**, and define a new queue.
3. At the Remote Host Name prompt type the NIC IP Address. Enter **PORT1** for the Remote Printer Name
4. Go to Control Panel, Printers, and choose **Connect**.
5. Select your driver and click on **Next**.

At this point, you should see an entry for your Windows lpr Spooler's printer in the "Available ports" listing. For example, C:\SPOOL\PRINTER_NAME.

Windows 95

Once you install the spooler onto the workstation; the setup program will create a group and icon.

1. Double click on the **spooler** icon.
2. Click on **setup**, define new queue.
3. At the Remote Host Name prompt type the NIC's IP Address, and for the Remote Printer Name enter **PORT1**.
4. Using the install program, install the printer driver that comes with the printer.
 Refer to the manual that came with the printer for details.
5. Open the **Properties** menu item of the printer icon.
6. Select the **Detail** tab.
7. Select the port that you want from the **Print to the following port** item.

Windows NT3.51

The following procedure is used to set up the lpr spooler on the Windows NT server.

1. Open **Control Panel**.
2. Go to **Printers**.
3. Choose **Printer Menu**.
4. Choose **Create Printer**.
5. Enter a printer name (for example, lprprinter).
6. Select the proper **printer driver**.
7. Type a description. This is optional.
8. In the **Print To** dialog, choose **Other**.
9. In Print Destinations window, select **lpr port**. This leaves you with **add lpr compatible printer** window.
10. Line 1: Address of host providing lpd (Print server); type **IP address**.
11. Line 2: Name of printer on that machine - type **PORT1** (the word PORT **MUST** be in uppercase).
12. Choose **OK** to exit.

Your NIC is now configured to operate Windows NT. You may print from any application by the following the normal print instructions for that application.

Windows NT4.0

The following procedure is used to set up the lpr spooler on the Windows NT server.

1. Using the install program, install the printer driver that comes with the printer.
 Refer to the manual that came with the printer for details.
2. Open the Printer Properties dialog box for the printer. Click **Ports** to display the Ports property tab.
3. Click **Add Port**.
 The available port types are displayed.
4. Select **LPR Port** and click **New Port**.
 If the LPR port is not listed, install the TCP/IP protocols. For details, see your Windows NT documentation.
5. In the **Add LPR compatible printer** dialog box, enter the NIC IP address.
 If your network uses Domain Name Services (DNS), enter the DNS name assigned to the NIC instead of the IP address.
6. Press **Tab** and type the internal name of the printer in lowercase letters.
7. Click **OK**.
 The workstation checks the address or DNS name that you entered and notifies you if it cannot resolve the address.
8. Close the Printer Ports property tab.
 The Ports property tab shows the new port configuration.
9. Click **OK** to close the Ports property tab.
 The new port has been configured. You should now print a test page to verify the connection.
10. Open the Printer Properties dialog box for the printer. Click **General** to display the General property tab and click **Print Test Page**.
 When you print, your files are transmitted over the LPR Port connection to the printer.
11. Click **OK** to exit the Printer Properties dialog box.

6.2 UNIX Printing

Note

- This manual cover general settings only. See your UNIX system manual for full details about setting procedures.

The NIC can support UNIX TCP/IP printing in two modes:

- Host-based lpd where a supplied line printer daemon is running on one or more workstations and print data is communicated to the NIC via a TCP/IP port or,
- Printer-based lpd where the printer appears as a host running a line printer daemon.

In general, printer-based lpd is easiest to use on BSD UNIX systems, requiring an entry in the printcap file once the NIC has its IP information. Some UNIX System V systems have restrictions on support of remote LPD printers, requiring that the host-based LPD approach be used. For many operating systems, you have the option of using host-resident printing or print server-resident printing. Each mode has certain advantages.

- The host-resident method can print the username and filename on its banner page; the print server-resident method prints a banner page with the host's name.
- The print server-resident method requires you to configure the printer only one time, when you install the print server. The host-resident method requires that a printing daemon be installed on every host that you want to be able to print jobs.

Note

- The NIC will also operate with other host-resident print supervisor/spooler programs that present a print image to the printer over a TCP/IP port. The base TCP/IP port number can be changed via Telnet, or the NIC HTML setup pages accessed by MAP or a Web Browser. Remember, the actual port is always one higher than the base port number. The status report indicates the actual port number.

Between the host-based and printer-based TCP/IP printing capabilities, the NIC works with:

- All UNIX systems that support lpd
- System V Rel. 4 (on 386 platforms)
- DEC ULTRIX RISC Versions 4.3 and 4.4
- DEC OSF/1 Versions 2.0 and 3.0
- Solaris:

 Version 1.1.3 (SunOS 4.1.3),

 Version 2.3 (SunOS 5.3),

 Version 2.4, and

 Version 2.5
- HP-UX Series 700 and 800 Version 9.01 and Version 10.0
- IBM AIX Version 3.2.5
- SCO UNIX Version 3.2
- AS/400

The CD-ROM also includes source code that you can recompile host-based code for configuring on other System V platforms.

6.2.1 Configuring the IP Address on the NIC

Regardless of the printing mode selected, the NIC must be given IP address and routing parameters. You can configure the IP address for the NIC in one of the following ways:

- Use MAP, as described in Chapter 3.
- Use AppleTalk NIManage utility program, as described in Chapter 5.
- Use the BOOTP (Bootstrap Protocol).
- Use the RARP (Reverse ARP) capability (Ethernet II frame type only).
- Use arp and ping capability.

For each method, you will need to provide the MAC Address of the NIC. The MAC Address is the 12-character code that is printed under MAC Address on the status report each time the printer is turned on.

You can use the BOOTP, RARP, or ping procedures only when the Print Server is in its factory default state (no IP information entered). After the Print Server has an IP address, you must use the *Telnet* utility, the AppleTalk NIManage utility for the Macintosh, or the NIC HTML pages accessed through the MAP or a Web Browser to change an IP address, Subnet Mask and Default gateway.

6.2.1.1 Using BOOTP

The BOOTP daemon is a native TCP/IP option for configuring the IP address of a diskless network device. To communicate the IP address, use the following procedure:

1. Turn off the printer.
2. Log in as superuser (root) on a host on the same subnet as the print server. However, if the server resides on another subnet, complete this procedure to store the IP address in the print server. Reconnect the print server anywhere on the network, and then use Telnet or the HTML pages accessed by MAP or a Web Browser to change the IP address. See *6.3 Running Telnet*, for instructions on using Telnet.
3. Find the MAC Address of the NIC. The address is printed on the status report each time you turn on the printer.

4. Edit the hosts file (usually /etc/hosts) or use NIS or DIS to add the IP address and NIC's node name. See the network administrator for the IP address. For example, you would type in the following for NIC named printfast with an IP address of 192.9.200.200:

```
192.9.200.200 printfast
```

5. Stop the BOOTP daemon if it is running.
6. Edit the /etc/BOOTPtab file and add the following information:

```
<NIC_host name>:\
        :ht = <hardware type>:\
        :ha = <MAC Address>:\
        :ip = <IP address>:\
        :sm = <subnet mask>:\
        :gw = <gateway address>:
```

For example, for an RFC 1048 system:

```
printfast:\
        :ht = ether:\
        :ha = 00206BAABBCC:\
        :ip = 192.9.200.200:\
        :sm = 255.255.255.0:\
        :gw = 192.9.200.254:
```

If running with a more recent BOOTP implementation, such as with SCO UNIX, add:

```
:vm = rfc1048:
```

The same information uses the following format on an RFC 951 system:

host	htype	haddr	iaddr	bootfile
printfast	1	00:20:6b:aa:bb:cc	192.9.200.200	defaultboot

7. Start the BOOTP daemon by typing:

```
#bootpd -s
```

8. Check the printer to verify that the NIC is connected to the network. Turn on the printer.
9. Wait until the printer powers up and finishes initializing to allow enough time for the IP address to become known and to be saved in NVRAM. The NIC should reinitialize itself.
10. After the NIC has been reinitialized, send a ping command to verify that the print server obtained its IP address. For example:

    ```
    #ping 192.9.200.200
    ```

 If the print server has the address, the result is a confirmation message:

    ```
    192.9.200.200 is alive
    ```

11. Remove, or comment out your changes to the /etc/BOOTPtab file.
12. Stop the BOOTP daemon and, if you want it to run, restart it.

6.2.1.2 Using rarp

The RARP (Reverse ARP) allows network devices to query a server for their IP addresses on start-up. For this procedure, there needs to be a workstation with a rarp server. To store the IP address, use the following procedure:

1. Turn off the printer.
2. Log in as superuser (root) on the rarp server in the same subnet on the print server. However, if the server resides on another subnet, complete this procedure to store the IP address in the print server. Reconnect the print server anywhere on the network, and then use the Telnet or the HTML pages accessed by MAP or a Web Browser to adjust the IP parameters for the subnet on which the NIC is to operate.
3. Find the MAC Address of the NIC. The address is printed on the status report when you power on the printer.
4. Edit the hosts file (usually /etc/hosts) or use NIS or DIS to add the IP Address and NIC's node name. See the network administrator for the IP address. For example, you would type in the following for a print server with the name of printfast:

    ```
    192.9.200.200 printfast
    ```

5. Edit the /etc/ethers file or use NIS or DIS to add the MAC Address. To continue the example, for the printfast card with an MAC Address of 00:20:6b:aa:bb:cc:

   ```
   00:20:6b:aa:bb:cc printfast
   ```

6. If the rarp daemon is running, stop it and restart it. Verify that the daemon is running.
7. Check the printer to see that the print server is connected to the network. Turn on the printer.
8. Wait until the printer powers up and finishes initializing to allow enough time for the IP address to become known and to be saved in NVRAM. The NIC should then reset itself.
9. After the NIC has reset, send a ping command to verify that the print server obtained its IP address. For example:

   ```
   #ping 192.9.200.200
   ```

 If the print server has the address, the result is a confirmation message:

   ```
   192.9.200.200 is alive
   ```

10. Remove, or comment out your changes to the /etc/ethers file.
11. Stop the rarp daemon and, if you want it to run, restart it.

6.2.1.3 Using arp & ping

Use the following procedure to enter the IP Address:

1. Turn off the printer.
2. Log in as superuser (root) on a host on the same subnet as the print server. However, if the server resides on another subnet, complete this procedure to store the IP address in the print server. Reconnect the print server anywhere on the network, and then use Telnet or the HTML pages accessed by MAP or a Web Browser to change the IP address. See *6.3 Running Telnet*, for instructions on using Telnet.
3. Find the MAC Address of the NIC. The address is printed on the status report each time you turn the printer on.

4. Edit the hosts file (usually /etc/hosts) or use NIS or DIS to add the IP address and print server's node name. See the network administrator for the IP address. For example, you would type in the following for a NIC with a name of printfast and an IP address of 192.9.200.200:

   ```
   192.9.200.200 printfast
   ```

5. Add an entry to the arp cache for the Print Server's IP address and MAC Address. For example:

   ```
   #arp -s 192.9.200.200 00:20:6b:aa:bb:cc
   ```

6. Check the printer to see that the NIC is connected to the network. Turn on the printer.
7. Send a ping command the NIC.
 For example:

   ```
   #ping 192.9.200.200
   ```

 or

   ```
   #ping printfast
   ```

 The NIC will not respond to this ping command but it will read its IP address from the packets.
8. Turn the printer off and back on again and then send the ping command again to verify that the print server obtained its IP address. If the NIC has the address, the result is a confirmation message:

   ```
   192.9.200.200 is alive
   ```

9. Remove the entry from the arp cache using the following command. Specify the NIC either by its IP address or by its name. For example:

   ```
   #arp -d printfast
   ```

6.2.2 lpd Printing

lpd is an implementation of the standard UNIX line printer daemon which lets you print across a TCP/IP network without the need to install software on your workstation with all filtering and banners done by NIC. Remote printing uses the same commands (lpr, lpq, lpc) as local printing.

The process begins when the lpr call finds a printer on a remote system by looking at the remote (rm) entry in the /etc/printcap file for that printer. lpr handles a print job for a remote printer by opening a connection with the lpd process on the remote system and sending the data file (followed by the control file containing control information for this job) to the remote system. The printer-based lpd then filters the data and prints the job according to information contained in the control file and its own printcap file.

NIC lpd recognizes the format of a certain printer emulations and filters the data, if possible, so it can be printed on the printer type you specify. You can indicate to the NIC lpd what type of printer is attached to by either:

1. Accepting the default port setting (PCL, PostScript and other), or
2. Changing the listed emulations via the Telnet or the HTML pages accessed by MAP or a Web Browser.

The following sections give specific lpd setup instructions for various systems.

6.2.2.1 Setting Up a BSD Remote Printer to Use lpd

To set up a remote printer on the host that sends jobs to NIC using printer resident lpd, add an entry to the /etc/printcap file on your host for each printer you use. The steps are described below.

1. Open the /etc/printcap file. Make an entry naming the NIC as the remote host and PORT1 as the remote printer name. A typical printcap entry is shown below:

   ```
   <printer_name>:\
   ```
 (for example, printer1)

   ```
   :lp=:\
   :rm=<remote_host>:\
   ```
 (for example, name as entered in /etc/hosts)

   ```
   :rp=PORT1:\
   :sd=/usr/spool/lpd/<printer_name>:
   ```
 (for example, spool directory on system used to spool data and control files)

This sends jobs spooled at /usr/spool/lpd/<printer_name> to the printer designated <printer_name> to be printed at port 1 (the internal connection to the printer) of the NIC designated as <remote_host>.

2. Create the spooling directory. For example, type:

   ```
   #mkdir /usr/spool/lpd/<printer_name>
   ```

3. To print via the spooler, use the lpr command. Type:

   ```
   #lpr -P<printer_name> <file_name>
   ```

Installation and testing is done. You are now ready to print.

6.2.2.2 Setting Up an AIX 2.5 Remote Printer to Use lpd

Set up a remote printer on the host that sends jobs to the NIC using the NIC's lpd. Use the following procedure to do this:

1. At the prompt, type:

   ```
   #smit spooler
   ```

2. When a window appears, select **Manage Remote Printers**.
3. When a menu appears, select **Client Services**.
4. Another menu appears. Select **Remote Printer Queues**.
5. Another menu appears. Select **Add a Remote Queue**.

6. When a window appears, change the values shown to configure the NIC. The values displayed are default values. You must replace the short and long form filter values with the values shown below.

Requested Information Input Data	Example	Description of Input Data
Name of queue to add	`printer1`	Name of local printer
queue Destination Host	`printfast`	NIC hostname as in /etc/hosts
Short Form Filter	`/usr/lpd/bsdshort`	Required value
Long Form Filter	`/usr/lpd/bsdlong`	Required value
Name of remote printer queue	`PORT1`	NIC
Name of device to add	`print1`	Name of local queue

7. After you have replaced all values, press Enter.

You can now print.

6.2.2.3 Setting Up an AIX 4.0 System

Use the following procedures to install a NIC in an AIX 4.0 system:

1. Run SMIT Printer.
2. Select **Print Spooling**.
3. Select **Add a Print Queue.**
4. Select **Remote**.
5. Use **Standard Processing**.
6. Assign a queue name.
7. Use the host address of the NIC for the Remote System.
8. Use **PORT1** for the queue on the remote system.
9. Add a description (optional).
10. Press Enter to generate.

Installation is complete. Test your printer by executing the following command:

```
#lp -d<queue_name> <file_name>
```

6.2.2.4 Setting Up an HP/UX Remote Printer to Use lpd

Set up a remote printer on the host that sends jobs to a NIC using the NIC lpd.

1. At the prompt, type:

   ```
   #sam
   ```

2. When a window appears, select **Printer/Plotter Manager**.
3. When the menu appears, select **List printer and plotters**.
4. When a list appears, select **Actions in the title bar**.
5. From the pull-down menu, select **Add Remote Printer**.
6. When a window appears, add values to configure NIC. See the following example.

Input Requested	Example	Description of Input Data
Printer Name	`printer1`	name to be used in lp command
Remote System Name	`printfast`	NIC hostname as in /etc/hosts
Remote printer Name	`PORT1`	lpd queue name

7. At the bottom of the screen, select **Remote Printer is on BSD system** from the three choices available.
8. Click on the **OK** button.
9. Ping the unit to test communications. Type:

   ```
   #ping <NIC IP address>
   ```

10. Ping should confirm your IP address with the message:

    ```
    <NIC IP address> is alive
    ```

11. If the connection is confirmed, you can now print.

6.2.2.5 Setting Up an AS/400 Systems to Use lpd

When working with the output queue description (WORKOUTQD), there are several fields that must be defined for the NIC to function properly as a remote printer device.

When prompted for the remote system, type **INTNETADR** so the AS/400 recognizes the device as an IP device.

12. Type **PORT1**
13. Connection type must be IP.
14. Internet address must be the IP address of the NIC.
15. Destination type must be OTHER.
16. When prompted for transforming SCS to ASCII, type **YES** to allow the AS/400 do the character translation.
17. Manufacturer type and model must be the print driver that goes with your printer.

6.2.2.6 Setting Up a DEC ULTRIX 4.3 RISC or OSF1/ ALPHA Remote Printer

Set up a remote printer on the host that sends jobs to a NIC.

1. At the prompt, type:

```
#lprsetup
```

2. Select **add**.
3. Enter a name for your printer and press Enter.
4. "Do you want more information on specific printer types?" Press Enter.
5. A list of ULTRIX-supported printers is listed. Type **remote** and press Enter.
6. Enter a printer synonym (alias) and press Enter.
7. Designate a spooler directory or accept the default spooler directory displayed and press Enter.
8. Designate a remote system name and press Enter.
9. Designate **PORT1** as the remote system printer name and press Enter.
10. You are asked to enter the name of a printcap symbol from a displayed list. Type **Q** and press Enter.

11. Your configuration is displayed. You are asked whether these values are final. Type **Y** or **N** and press Enter. An example is shown below.

Printer #7 Symbol	Type	Representative Value
lp (line printer)	STR	
rm (remote host)	STR	`<NIC IP address>`
rp (remote printer)	STR	`PORT1`
sd (spooler directory)	STR	`/usr/spool/lpd7`

12. Add comments to the printcap file. For example, you can type:

```
Dick's printer down the hall
```
Enter

13. Select **exit** to save your configuration and press Enter.

You are now prepared to print.

6.2.2.7 Setting Up a SCO UNIX Remote Printers to Use lpd

Set up a remote printer on the host that sends jobs to a NIC using lpd. Use the following procedures to do this:

1. At the prompt, type:

```
#mkdev rlp
```

Note

- You cannot run mkdev rlp twice. If you have additional printers to be configured, use the **rlpconf** command.

2. You will now be asked a series of questions. Respond as follows. "Do you want to install or remove a remote printer?" Type: **I**
3. "Do you want to change printer description file /etc/printcap?" Type: **Y**
4. Type in a printer name. For example, type: **printer1**
5. "Is printer1 a remote printer or a local printer?" Type: **R**
6. Enter remote host name: type host name entered in printcap for NIC. For example, type: **printfast**

7. Confirm the information you have entered. Type: **Y**
8. Confirm the preceding connection as your system default. Type: **Y**
9. Enter another printer name or quit setup. Type: **Q**
10. "Do you want to start the remote daemon now?" Type: **Y**
11. Using a line editor of your choice, **edit the /etc/printcap file by changing the :rp= entry to PORT1**. For example,

```
printer1:\
        :lp=:\
```
(used to specify the device name for a local printer; this field must be empty)

```
        :rm=printfast:\
```
(NIC hostname as in /etc/hosts)

```
        :rp=PORT1:\
        :sd=/usr/spool/lpd/printer1:
```
(name of the spool directory on the client)

6.2.2.8 Setting Up System V Rel.4 and Solaris 2.X to Use lpd

If your system recognizes the LPSYSTEM command, you can use lpd. Another option is the admintool if your system supports it.

LPSYSTEM Installation

Use the following procedures to install LPSYSTEM:

Note

- The following must be executed from the Bourne Shell. Type:
 `#sh`
 to enter the Bourne Shell program.

1. At the prompt, type:

```
#lpsystem -t bsd <NIC IP address>
```

2. Enter NIC host name in /etc/hosts file. Your system may want its IP address instead of the remote host name.

3. At the prompt, type:

```
#lpadmin -p <local printername> -s <remote
host name or IP address>!PORT1
```

Note

- There is no space after the remote host name.

4. At the prompt, type:

```
#enable <local printername>
#accept <local printername>
```

6.2.3 Installing TCP/IP for NIC If Not Running lpd

The CD-ROM provided with the NIC includes install scripts for various UNIX systems. This section describes how to install TCP/IP printing to the NIC on any of the following operating systems:

- DEC ULTRIX 4.3 RISC
- System V Rel. 4
- Solaris (Ver. 1.x, 2.x)
- SCO UNIX
- OSF1/ALPHA
- IBM AIX
- HP/UX

Once the NIC has its IP information loaded, the following steps are necessary for Host-Side TCP/IP printing:

1. Load the print server software on your workstation. It is presented as a tar file on the CD-ROM.
2. Run the appropriate installation script, if available.
3. Complete the configuration for your operating system.

6.2.3.1 Loading the Software

The following procedures are only necessary when using the supplied host-based lpr capability. Loading the software is not necessary if printer-based lpr is used.

1. Log in as superuser (root) to the system that spools directly to the print server.
2. Insert the CD-ROM in the host drive.
3. Go to or create the directory in which you want to install the software. For example:

```
#mkdir /usr/MLT_install
```

Note

- If you already have a NIC at your site and you are now installing another one, delete the files in the installation directory (not /usr/nic). If these files remain, they can prevent the installation of a subsequent print server.

4. Use the tar command to load the software from the CD-ROM.
5. After performing the tar, the system will display a list of NIC files copied by the tar. At this point, go to the specific section for your system for instructions on running the installation script.

6.2.3.2 Script Selection of Filters

There will be certain options in executing the script for various systems.

One of the questions posed by the install script is whether the printer is a PostScript printer. If you answered *no* to this question, the install script uses an input filter (infilter) that supplies CR/LF translation to print ASCII files on a PCL printer. If you answered yes to this question, your printcap file will reference psfilter which offers easy ASCII-to-PostScript conversion. Normal PostScript format files are not affected. Proprietary and public domain filters are available for broader filtering capabilities.

6.2.3.3 Manual Selection of Filters

The NIC ships with an input filter called **psfilter** and an output filter called **psbanner** to print PostScript banners.

You may wish to change **infilter** or **outfilter** entries in the /etc/printcap file. The following is a sample printcap entry using these filters:

```
<printer_name> | NIC printer:\
       :lp=/dev/nic/<printer_name>:\
       :if=/usr/nic/psfilter:\
       :of=/usr/nic/psbanner:\
       :sd=/usr/spool/<printer_name>:
```

6.2.3.4 Installing and Printing on Solaris 1.X and OSF1/ALPHA Systems

1. Run the Installation script by typing:

   ```
   #nicinst
   ```

 The script automatically downloads the correct NIC utilities for your particular system and prompts you for information as needed.

2. "What is the node name of the Print Server unit? "

 Type the node name entered in /etc/hosts. For example: **printfast** and press Enter.

3. "What is the printer name?"

 Type the desired printer name and press Enter.

4. Your screen will now display the information you provided to the install script. For example:

   ```
   Node name of the NIC: printfast
   Printer name to be used: <printer_name>
   The printer is attached on: PORT 1
   ```

You are asked to OK this configuration. Type **yes** or **no** and press Enter.

5. "Is this printer PostScript?"

 Type **yes** or **no** and press Enter.

6. The script creates a printcap entry for the printer just configured. The screen displays the entry and asks if you want the script to append it to your /etc/printcap file. See below for a sample printcap file. Type **yes** or **no** and press Enter. If you type no, you may perform manual edits.

 In your /etc/printcap file, be sure not to change the name of the device given NIC in Step 2. You must reference the same lp: entry you wrote on the lp command line of the printcap file. For example:

   ```
   <printer_name> | NIC printer:\
          :lp=/dev/<printer_name>:\
          :if=/usr/nic/infilter:\
          :sd=/usr/spool/<printer_name>:
   ```

 All printcap entries must be prefaced with a tab except for the entry on the first line.

7. The script creates a spool directory in /usr/spool and starts the daemon for the newly configured printer. It also displays the path used if you ever need to restart the daemon. For example:

   ```
   /usr/nic/lpr_print /dev/nic/<printer_name>
   printfast 10001 &
   ```

8. Run the ps command so that you can view all your lpd processes. Type:

   ```
   #ps -ax | grep lpd
   ```

9. Kill all of your lpd processes. Type:

   ```
   #kill -9 <Process ID>
   ```

 (this will stop ALL printing).

10. Restart the daemon. Type:

    ```
    #/usr/lib/lpd
    ```

11. Installation for the system is done. You are prompted to configure any more printers.

 Type **yes** or **no** and press Enter. We also suggest you ping the NIC to test communications.

6.2.3.5 Installing & Printing on an DEC ULTRIX 4.3 RISC System

1. Run the Installation script by typing:

   ```
   #nicinst
   ```

 The script automatically downloads the correct NIC utilities for your particular system and prompts you for information as needed.

2. "What is the node name of the Print Server unit?"

 Type the node name entered in /etc/hosts. For example: **printfast** and press Enter.

3. "What is the printer name?"

 Type the desired printer name and press Enter.

4. Your screen will now display the information you provided to the install script. For example:

   ```
   Node name of the NIC: printfast
   Printer name to be used: <printer_name>
   The printer is attached on: PORT 1
   ```

 You are asked to OK this configuration. Type **yes** or **no** and press Enter.

5. "Is this printer PostScript?"

 Type **yes** or **no** and press Enter.

6. The script creates a printcap entry for the printer just configured. The screen displays the entry and asks if you want the script to append it to your /etc/printcap file. See below for a sample printcap file.
 Type **yes** or **no** and press Enter. If you type no, you may perform manual edits.

```
<printer_name> | NIC printer:\
       :lp=/dev/<printer_name>:\
       :if=/usr/nic/infilter:\
       :sd=/usr/spool/<printer_name>:
```

7. Installation for the system is done. The program prompts you to configure any more printers. Type **yes** or **no** and press Enter. We suggest pinging the NIC to test communications.

Like all BSD systems, ULTRIX uses the /etc/printcap file to configure a printer. The interface to the installation script is the same for all BSD systems, however, the printcap entry is different.

If you use the printcap entry generated automatically by the installation script, this will be transparent to you.

6.2.3.6 Installing and Printing on the HP/UX System

1. Run the Installation script by typing:

```
#nicinst
```

2. The script automatically downloads the correct NIC utilities for your particular system and prompts you for information as needed.
3. "What is the node name of the Print Server unit?"

 Type the node name entered in /etc/hosts. For example: **printfast** and press Enter.

4. "What is the printer name?"

 Type the desired printer name and press Enter.
 Your screen will now display the information you provided to the install script. For example:

   ```
   Node name of the NIC: printfast
   Printer name to be used: <printer_name>
   The printer is attached on: PORT 1
   ```

 You are asked to OK this configuration. Type **yes** or **no** and press Enter.

5. The script starts the daemon for the newly configured printer automatically. It also displays the path used should you ever need to restart the daemon. In the following example, the path would be:

   ```
   /usr/nic/lpr_print /dev/nic/<printer_name>
   printfast 10001 &
   ```

 This example reflects names supplied to the script earlier.

 When the installation script is complete, you must configure the printer and make it known to the lp system. The HP/UX lp system uses the lpadmin maintenance command to configure a printer (there is not a /etc/printcap file). The specific commands to do this are:

   ```
   #lpadmin -p <printer_name> -v /dev/nic/
   <printer_name>
   #enable <printer_name>
   #accept <printer_name>
   ```

 You can also use other options for the lpadmin command. See your system documentation for details.

Note

- The printer name must be the same as the one you entered during the NIC installation. HP supplies the **sam** program as an alternative to configure the printer.

When using **sam**, specify everything as if the printer were directly connected to /dev/lprprinter/<printer_name>.

The software installed with your HP system can satisfy most of your printing needs. HP supplies ASCII-to-PostScript filters and the system will invoke them automatically if you define the content type of the printer as PostScript. The HP/UX lp system also supplies interface scripts that produce PostScript banners. Use the **lpfilter** command to define new filters and content types if necessary. The full power and flexibility of the lp print service is now available to you. The fact that you are printing across the network is completely transparent.

6.2.3.7 Installing and Printing on a System V (Solaris 2.X)/System V Rel.4 386-based Machine

Installation and setup is exactly the same for System V Solaris and SVR4 i386-based machines. Solution uses a network direct filter called **nicfilter**. The system invokes nicfilter directly from the printer interface file. To load the software, create a /usr/nic directory and tar the CD-ROM to it.

1. Go to the /usr/nic directory by entering the following:

```
#cd /usr/nic
```

2. Run the Installation script by typing:

```
#nicinst
```

Once the operating system has been identified, the script downloads the files for your particular system, to the /usr/nic directory, and prompts you for information as needed.

3. At the prompt, type:

```
#cp /usr/spool/lp/model/standard /usr/nic/
port1_interface
```

Note

- Use of this default interface in most cases will suffice for generic or routine printing of most PostScript, PCL, and ASCII files. In order to utilize a printer specific interface other than the default interface script (named standard), you must have a copy of that printer interface edited and installed in the /usr/nic directory.

Next, you will need to edit the printer interface program you created in step 3.

4. At the prompt, type:

   ```
   #cd /usr/nic
   ```

 and using your favorite editor, open and edit the port1_interface file.

5. Search on FILTER=" and insert the following line above or below the # FILTER="${LPCAT} section of the file. Remark out (using the # sign) any other FILTER entries present in this section of the file.

   ```
   FILTER="/usr/nic/infilter | /usr/nic/
   nicfilter printer_server_name 10001"
   ```

Note

- The <printer_server_name> must be the same as the one present in the /etc/hosts file. Optional arguments to be inserted after the 10001 entry and before the trailing "are ${banner}, ${user_name}, ${request_ID}, and ${files}. For further explanation of these and the statement above, refer to the S*ystem 5 Release 4 System Administration Manual.*

6. Save the file and close the editor.

 You need to configure the host-side printer using lpadmin.

7. Type the following:

   ```
   #lpadmin -p <printer name> -v /dev/null -i
   /usr/nic/port1_interface
   ```

Note

- lpadmin configures the printer name and associates it with a given device and printer interface program. There is no /etc/printcap file involved with this method of configuration.

Next, you need to initialize the printer

8. Type the following commands:

```
#accept <printer name>
#enable <printer name>
```

Note

- After each entry, lpadmin should provide an acknowledgment of the command invoked.

9. Type the command:

```
#lp -d<printer name> /etc/hosts
```

Check for output, or type the following:

```
#lpstat <printer name>
```

or

```
#lpstat -t
```

6.2.3.8 Installing & Printing on a SCO UNIX System

Installation and setup is similar for HP/UX and SCO UNIX systems. The NIC solution uses a network direct filter called nicfilter. The system invokes nicfilter directly from the printer interface file.

After completing software download in Section *6.2.3.1 Loading the Software*, you must configure the printer and make it known to the lp system. Follow the steps below:

1. Run the Installation script by typing:

```
#nicinst
```

The script automatically downloads the correct NIC utilities for your particular system and prompts you for information as needed.

2. Select your system. Choose one from these options:

```
1) AT&T/SVR4; 386
2) SCO UNIX System V
3) None of the above
```

 Type **1**, **2**, or **3** and press Enter.

3. "What is the node name of the NIC?"

 Type the name assigned in the /etc/hosts file and press Enter. For example: Type **printfast** and press Enter.

4. "What is the printer name for this NIC-linked printer?"

 Type a printer name and press Enter.

5. Your screen will now display the information you provided the install script. For example:

```
Node name of the NIC: printfast
Printer name to be used: <printer_name>
The printer is attached on: PORT 1
```

6. "Do you want to accept this configuration?"

 Type **yes** or **no** and press Enter.

7. "Is this printer PostScript?"

 Type **yes** or **no** and press Enter.

8. The script automatically starts the daemon for the newly configured printer. It also displays the path used should you ever need to restart the daemon. In the preceding example, the path would be:

```
/usr/nic/lpr_print /dev/nic/<printer_name>
printfast 10001 &
```

This example reflects names supplied the script earlier.

When the installation script is complete, you must still configure the printer and make it known to the lp system.

The SCO UNIX lp system uses the lpadmin maintenance command to configure a printer (there is no /etc/printcap file). The specific commands to do this are:

```
#lpadmin -p <printer_name> -v /dev/nic/
<printer_name>
```

Note

- Your host may require you to specify the model by using the -i command.

```
#enable <printer_name>
#accept <printer_name>
```

You can also use other options for the lpadmin command. See your system documentation for details. Note that the printer name must be the same as the one you entered during NIC installation. SCO supplies the sam program as an alternative to configure the printer.

When using **sam**, specify everything as if the printer were directly connected to /dev/nic/<printer_name>.

The software installed with your SCO system can satisfy most of your printing needs. SCO supplies ASCII-to-PostScript filters and the system will invoke them automatically if you define the content type of the printer as PostScript. The SCO UNIX lp system also supplies interface scripts that produce PostScript banners. Use the lpfilter command to define new filters and content types if necessary. The full power and flexibility of the lp print service is now apparent. Your printing across the network is completely transparent.

6.2.3.9 Installing and Printing on an AIX RISC System/6000

The AIX printing subsystem is driven by the qdaemon program. The qdaemon uses configuration information stored in the /usr/lpd/qconfig file to manage queues and route jobs to the proper devices. This information includes entries for each virtual printer and physical device known to the system.

An AIX virtual printer is simply a high level software view of a data stream, queue, and device that controls how a given job will be processed. A different virtual printer should be defined for each data stream that a real printer supports. For example, you would use different virtual printers for PostScript and PCL jobs even though they are destined for the same physical printer.

Configuring a NIC printer on an AIX system approximates configuration of a local printer as closely as possible. The only difference is that the physical device associated with your NIC printer must be a named pipe used by the print daemon to route data to NIC. The most straightforward way to add a printer to your system is:

1. Run the Install script by typing:

   ```
   #nicinst
   ```

 The script automatically downloads the correct NIC utilities for your particular system and prompts you for information as needed.

2. "What is the node name of the Print Server unit?"

 Type the node name entered in /etc/hosts, For example: Type **printfast** and press Enter.

3. "What is the printer name?"

 Type the desired printer name and press Enter.

4. Your screen will now display the information you provided to the install script. For example:

   ```
   Node name of the NIC: printfast
   Printer name to be used: <printer_name>
   The printer is attached on: PORT 1
   ```

 You are asked to OK this configuration. Type **yes** or **no** and press Enter.

5. Configure a virtual printer using <printer_name> as the physical device, where <printer_name> is the same printer name chosen during install.

6. Shut down the qdaemon using the command

   ```
   #stopsrc -s qdaemon
   ```

7. Edit /usr/lpd/qconfig to change the special file for device <printer_name> from /dev/<printer_name> to /dev/nic/<printer_name>.
8. Restart the daemon with:

   ```
   #startsrc -s qdaemon
   ```

The installation script then will create the named pipe and starts the supplied print daemon using the printer name and NIC information you supplied. Since the AIX System Management Interface Tool (SMIT) will not accept a named pipe as a printer device, the installation script also creates a null character device in /dev/<printer_name>.

6.2.3.9.1 Virtual Printer Commands

Virtual printers can be added either through SMIT or through the mkvirprt command, entering the device name <printer_name> for configuration purposes. During this process you also select a particular printer type for the new printer, which inherits the set of predefined attributes for that printer type. In most cases, this set of attributes will be sufficient, but it can be changed either through SMIT or by using the **chvirprt** command. If you need more extensive changes on your printer, see the *AIX RISC System/6000* documentation for assistance. After the virtual printer has been added, there will be a stanza in /usr/lpd/qconfig for device <printer_name> that looks like the following:

```
<printer_name>:
file=/dev/<printer_name>
backend=/usr/lpd/piobe
```

Edit /usr/qconfig and change

`file=/dev/<printer_name>` to `file=/dev/nic/<printer_name>`

Output spooled on the virtual printer as defined above, will now be sent to the named pipe and routed to NIC. Before you edit the files above, be sure that the following daemon is running:

```
/usr/nic/lpr_print /dev/nic/<printer_name>
printfast 10001 &
```

6.2.3.9.2 AIX Print Commands

The AIX lp command works slightly differently than the lp command for other System V Release 4 systems. The following lp commands can be used to print files:

```
#lp -d<queue_name> <filename>
```

or

```
#lp -d<queue_name>:<device_name> <file_name>
```

6.3 Running Telnet

The Telnet utility uses the standard remote terminal protocol to configure the IP address, lpd printers, and other parameters on your system. Use the following guidelines to run Telnet. You have the same functionality with the HTML pages accessed by MAP or a Web Browser, as described in Chapter 3.

- Most often, you make selections from menus by toggling between one choice or another, by selecting/deselecting or enabling/disabling an item.
- Press Enter, when not selecting an item. This will return you to a previous menu.
- If you do not make a menu selection for 2 minutes, you get a "Two Minute Warning" that within 2 more minutes your Telnet session will end. This ensures that one user does not leave a session idle for too long.

6.3.1 Making Connection and Main Menu

1. At the prompt, type:

   ```
   #telnet <NIC IP address>
   ```

2. When login: appears, type **guest** if you are only interested in browsing the menus or **sysadm** if you want to change the configuration. Press Enter. When password: appears, again type **guest** or **sysadm** and press Enter.
3. The main menu is displayed. This utility lets you change the IP Parameters, lpd printers, protocols, restore to factory defaults, and change password. Press the number for the parameter you wish to check or change and press Enter.

```
The Configuration Utility
Unit Serial no. 460121 V5.04

Main Menu

1.  IP Parameters
2.  LPD Printers
3.  Protocols
4.  Reset Unit
5.  Restore Factory Defaults
6.  Change Password
E.  Exit
```

4. To end your Telnet session, type **E** at the Main Menu. If you have made any changes you are prompted to either Save Changes and Exit or Exit Without Saving Changes. Choose your option and press Enter.

Note

- Press **?** to access the Telnet help utility.

6.3.2 Configure IP Parameters

Although the NIC must have an IP address before a Telnet Connection can be made, you can use the utility to change the address or the other IP parameters. The NIC will automatically initiate a soft reset when the IP address change is sensed.

Note

- This will cause the Telnet connection to be broken. It is advisable to make all other desired changes before changing the IP address.

1. At the Main Menu, type **1** and press Enter to bring up the IP Parameters menu (shown on the next page).

2. Type **1** again and press Enter. The IP Address submenu will appear:

The Configuration Utility Unit Serial no. 460121 V5.04		
1.	IP Address	192.9.200.200
2.	Subnet Mask	255.255.255.0
3.	Default Gateway	199.9.200.254
4.	Base Port Number	10000

3. Enter a new IP Address and press Enter. Repeat the previous steps to change Subnet Mask and Default gateways.
4. Enter **4** to change the base port number.

Note

- The base port number is one less than the actual TCP/IP port number used by the printer. For example, to set the port number to 9100, enter 9099.

6.3.3 Select Printer Languages

Selection 2 in the Main Menu allows you to designate which emulations (printer interpreter languages) the printer supports. This is to allow the resident lpd to modify files intended for other emulations so that they may be printed. The menu also allows you to enable or disable banners attached to lpd handled jobs.

The emulation choices are Printer Control Language (PCL), PostScript (PS), ASCII (simple text) and Other (any print job not recognized as PCL, PS, or ASCII). The file modifications and conditions are:

Print Server Setup	Job Detected to be	Action
PCL	ASCII	<CR> changed to <CR><LF>
not PostScript	PostScript	Job discarded
PostScript	ASCII	PostScript header added, <CR> changed to <CR><LF>
PCL, PS, ASCII	any	no action

1. To access the LPD Printers menu, type **2** and press Enter. For a unit at factory default, the menu shown below appears.

LPD Printers	
1. Printer 1	PCL PS OTHER
2. Banners	DISABLED

2. To change the set of emulations, type **1** and press Enter. The options shown below appears.

Printer 1	PCL PS OTHER
1. PCL	
2. PS	
3. ASCII	
4. OTHER	

3. To delete an emulation, select the number opposite the language listed. For example, type **1** and press Enter to delete PCL. Typing **1** again will again selects PCL.
4. From the LPD Printers menu, press **2** to toggle Banners between Enabled/Disabled.

6.3.4 Enable/Disable Network Protocols

To enable network protocols, at the Main menu type **3** and press Enter. You are given the choice of disabling either NetWare or AppleTalk.

6.3.5 Reset Unit

In order to reset the NIC, type 4 into the main menu and press Enter on the keyboard.

Note that resetting the NIC initializes the network interface without effecting the printer interface.

6.3.6 Restore Factory Defaults

When it is necessary to restore factory defaults on your print server, choose **5** on the Main Menu and press Enter. All NVRAM stored parameters return to their factory default values. The factory default values will not take effect until the Telnet program is exited and the unit is power cycled.

6.3.7 Change Password

When you want to establish a new password, enter **6** from the Main menu. Type up to eight characters after the New Password query and press Enter. Retype the same characters at the Retype New Password query and press Enter. Use the **Save Changes and Exit** option. Once you have established your password using Change Password, the password sysadm will be rejected.

Note

- There is a single maintenance access password to the NIC. This password is used for both Telnet and HTML pages. This password may be changed from Telnet or from HTML pages (accessed either via MAP or Web Browser).

6.3.8 Exit Telnet

Use the following procedures to exit Telnet:

1. To end your Telnet session, type **E** at the main menu. If you have made any changes, the following menu appears:

```
The Configuration Utility
Unit Serial no. 460121 V5.04

Exit

1. Save Changes and Exit
2. Save Changes and Reset
3. Exit Without Saving Changes
```

2. Choose your option and press Enter. For example, type **2** and press Enter. The program saves your changes and resets the print server so that the changes take effect.

6.4 FTP Printing

Use the following procedure for using FTP (File Transfer Protocol) to print.

1. Start up the FTP client and look into the print server card using the following setting.

 Host Name: `<NIC IP address>`
 Login Name: `port1`
 Password: `(none)`

2. Upload (PUT) the file you want to print.
3. The printer prints the uploaded (PUT) file.

Note

- FTP Printing does not support selecting multiple file names.
- Only one person can be logged on to a port at any particular time.

6.5 Dynamic Host Configuration Protocol

DHCP is a service much like bootp that provides a method for assignment and maintenance of IP addresses. The NIC is able to obtain IP information from this service.
There are two user settable variables related to the DHCP function. These are accessible in the TCP section of Network Administration, in the HTML pages.

1. DHCP enable; and
2. Use IP info in NVRAM

a. If DHCP is not enabled, the NIC sends no DHCP requests under any circumstances. If the NIC does not have an IP address stored, or if "Use IP info in NVRAM" is OFF, the NIC issues BOOTP requests, etc.
b. If DHCP is enabled, the NIC sends DHCP requests when the NIC is reset or on power up, provided that the NIC does not have an IP address stored, or that "Use IP info in NVRAM" is OFF. If the IP address cannot be obtained by DHCP, an attempt to obtain the IP address using BOOTP and RARP is made.
c. If DHCP is enabled, and the NIC had an IP address in NVRAM, and "Use IP info in NVRAM" is ON, then the NIC uses the IP information from NVRAM and there is no DHCP activity on the part of the NIC.

The factory default is with both DHCP enable ON and Use IP info in NVRAM ON. In this case, the NIC issues DHCP requests if it does not already have IP identification information stored in its NVRAM.

Important!

- If DHCP and the NIC is in the default mode ("Use IP info in NVRAM"= ON), you must establish a **permanent lease** or reservation for the NIC in the DHCP server. Failure to do this may cause the same address to be given out to another host.

Chapter 7

Operation and Troubleshooting

This chapter describes normal operation of the NIC in the printer, and also provides information on how to troubleshoot any problems you might have with the NIC.

7.1 LED Status Indicator

The NIC has two LED status indicators: amber and green. The amber LED generally indicates job activity; it flashes when a print job is being communicated to the NIC; it is off when no activity is occurring.

The green LED indicates the operating condition of the NIC when it is powered on during normal operation. The following table provides the conditions that this LED may indicate.

LED Patterns	And the printer is...	Then The NIC...	Operating Condition
Green LED is ON solid.	First powered on.	Is performing self-tests.	Normal
	Awaiting print jobs.	Is functioning properly.	Normal
Green LED - blinks 3 times and stays on.	Finished with self-tests.	Prints out status report.	Normal
Green LED blinks rapidly.	Performing self-tests.	Detects bad RAM chip.	Error
Green LED blinks rapidly 4 times then pauses.	Performing self-tests.	Failed the Ethernet hardware self-test. Check the network.	Error
Amber LED blinks short for 10 seconds. Amber LED goes off and the Green LED blinks continuously.	Performing flashmemory self-tests.	Did not pass the checksum test. Unit automatically goes into download mode and awaits flash update.	Error

LED Patterns	And the printer is...	Then The NIC...	Operating Condition
Green LED blinks slowly.	Awaiting print jobs sometime after power-on completes.	Some printer interface error.	Error
Green LED blinks rapidly.	Awaiting print jobs.	Has lost its NetWare connection to file server.	Error
Green LED alternately blinks with amber indicator.	Finished with power-on sequence.	Has been reset to factory defaults. Power off and move jumper JP2 to OFF position.	Error

7.2 Status/Configuration Report

The Status/Configuration report is sent as a print job to the printer when the print server is powered on. For example, the report on the next page shows the configuration of the print server immediately before the report is printed. Some printers also allow you to use a command from the front panel that produce a Status/Configuration report.

It is strongly recommended that you review this report immediately after installation and any time the setup has been changed. If the report does not include a protocol that was configured, check that the procedure was done properly.

```
Unit Serial No: 460121           Version: 02.11

Network Address: 00:20:6b:aa:bb:cc

Network Topology:Ethernet        Connector: RJ45

Network Speed:10 Megabits

Novell Network Information       enabled

   Print Server Name: MLT_460121

   Password Defined: No

   Preferred Server Name: SERVER1

   Directory Services Tree: DSTREE1

   Directory Services Context: DSCONTEXT1

   Frame Type: Novell 802.3

Peer-to-Peer Information         enabled

   Frame Type: Novell 802.3

   Network ID: 3221866504

TCP/IP Network Information       enabled

   Frame Type: Ethernet II       Protocol Address:192.9.200.200

   Subnet Mask: 255.255.255.0    Default Gateway: 192.9.200.254
```

```
AppleTalk Network Information     enabled

   Frame Type: 802.2 SNAP On 802.3

   Protocol Address: Net Number 010 Node Number 19 Socket Number
   129

Preferred Appletalk Zone: *
----------------------------------------------------------

Novell Connection Information

Printer Name: P1

   File Server: LEFT

      Queue: Q1                    Priority: 1  Attached: Yes

      No Notify Defined

   File Server: RIGHT

      Queue: Q2                    Priority: 1  Attached: Yes

      No Notify Defined

Peer-to-Peer Connection Information

   Printer Name: P2

AppleTalk Connection Information

   AppleTalk Printer Name: Acme Page Printer

TCP/IP Connection Information

   Port Number: 10001
```

7.3 Resetting the NIC to Factory Default

You can cause the NIC to restore all parameters to factory default values, so the NIC appears just as it came from the factory. You may choose to do this when the NIC is moved to a new location where the environment (NetWare file servers, IP subnets, and so on) is different.

This process is called “Reset to Factory”. It can be done with the standard Telnet or Web pages (accessed via MAP or a Web Browser) utility. However, if network access is not possible, the following method may be used.

Note

- Resetting to factory default means that the print server loses all data such as names and IP addresses. It does not lose its serial number and MAC Address.

7.4 How to Diagnose Problems

Use the following list to determine the cause of printing problems:

1. Verify that the printer is functioning properly.

- **Is the printer printing?**
 Make sure the printer is operating properly by causing it to generate a test page. See your printer's owner's manual for instructions on generating a test page.
- **Is the printer on-line?**
 Verify that the printer is on-line or else nothing will print.
- **Did you get a NIC status page?**
 On power-up, the Print Server sends a status page which may contain information that can be useful for troubleshooting. Keep the status page available until a problem is resolved.

Note

- The start-up Configuration and Status Page from the NIC may be disabled via the maintenance access provisions.

2. Check the NIC's LED status indicator to ensure that there is no error condition. See *7.1 LED Status Indicator*, for more information.
3. Check the status report to see what protocols are enabled and active. See the appropriate chapter to confirm that you have installed and configured your network protocol correctly for the NIC. See *7.2 Status/Configuration Report*, for an example of the status report.
4. If you added, changed, or removed any new hardware on the network, verify that it was installed correctly.
5. If you added any new software applications, make sure the program is compatible and installed correctly on the network. See your network protocol documentation to confirm.
6. Determine if other users can print. If they can't and they are all on the same NOS, go to the troubleshooting section for that NOS.

When you have determined the nature of the problem, use the checklists in the next section.

7.5 Troubleshooting Checklists

Use the checklists in this section to identify and solve problems.

7.5.1 Troubleshooting Network Hardware Connections

Be sure that the NIC has properly selected the connector type that you are using.

- Check that the network connector is plugged into the RJ connector on the NIC.
- Try another cable to make sure you do not have a bad cable.

If you are using a 10BaseT concentrator hub that does not support the link signal, use Manual Ethernet Port selection instead of the factory default or the Automatic Ethernet Port selection. Refer to *Appendix A*.

7.5.2 Troubleshooting NetWare Protocol

It is recommended to use MAP to get the NetWare setup and parameter values. If you have not resolved the problem after running MAP, go through the checklists in this section.

7.5.2.1 NetWare Checklist

- Is the print server name entered correctly?
 The factory-default name is `MLT_<serial number>`. The serial number is located on the NIC.
- Did you assign print queues to the printer?
 It is recommended to assign each print queues to only one NIC-connected printer. If print queues are assigned to other network printers, the print jobs may be going to an other network printer.

- Did you assign the printer to the type Remote Other /Unknown? If the PCONSOLE settings are correct, the connection between the printer and network may have been broken. Turn the printer off and, using PCONSOLE, wait for the status message Not Connected. Turn the printer on and the status should change to Waiting for Job.

7.5.2.2 File Server Checklist

- Is there enough disk space on the file server and is it running?
- Is the correct file server associated with the printer? Use PCONSOLE to check this.
- Did you have the proper rights to configure the printer?
- Are the File Server and the Print Server communicating? Run NetWare's COMCHECK utility from any network workstation to check this.
- Are there enough user positions on the File Server? The Print Server function logs on as a user.

7.5.2.3 Workstation Checklist

- Is the network loaded onto the workstation? See the NetWare documentation.
- Is the application set up to print to the printer? For instance, are you using the correct driver?
- Is the workstation connected to the correct print queue? Print a file and verify that the file goes to the queue.
- Are the print queues assigned to the NIC-connected printer also assigned to another network printer? If they are, the print jobs may be going to that printer.
- From PCONSOLE, enter a sample print job directly into an assigned queue. Does the job become Active? Is job printed?

- **Is AUTO ENDCAP enabled?**
 Auto Endcap lets you send data to a network printer. Use PRINTCON to check. If not, enable it.

7.5.2.4 NIC Configuration Checklist

If all your hardware connections are correct, check the following:

- Use MAP to check the status of the print server.
 The Report Print Server Status screen shows the status for the selected NIC. This report includes a status of file servers and queues assigned to a printer along with a description of any problems.
- The printer may not be assigned to the correct print queues. Use PCONSOLE to direct print jobs to the correct queues, then check to see if the print job is in the queue.
- If devices were added or changed, use PCONSOLE to make sure you configured the new devices correctly.
- Make sure the NIC's name has been entered correctly. If you changed the name in MAP Program, you must also change the name in PCONSOLE before you can print.
- Use PCONSOLE to check the Printer Status. Make sure it is not stopped or paused.
- You cannot use PCONSOLE Version 1.0 to configure the NIC. Contact Novell for an upgrade.

7.5.2.5 Printer Server/File Server/Printer Checklist

Check the following to see if:

- The NIC can not log into the file server, or cannot service jobs from a File Server.
- The Print Server name is listed on that File Server, or cannot service jobs from a File Server.

- The password assigned to the NIC through PCONSOLE matches the password assigned through MAP Program. Use MAP to update the password stored in the network Print Server's memory.
- The print job is in the print queue and waiting to be printed. Use PCONSOLE to check if the print jobs are being sent to the printer.

7.5.2.6 Workstation to NIC Connection Checklist

To make sure the workstation is communicating with the NIC, check the following:

- Print a file from the workstation and make sure the print job gets to the print queue using PCONSOLE. If the print job does get to the queue, the problem is not with the workstation/print server connection.
- Use CAPTURE to send data to the printer from a workstation software application. See your NetWare print server manual for information.
- Make sure another printer is not taking the print jobs from the queues BEFORE the NIC can service the job. To do this, disable the other printer until you can verify the NIC-connected printer setup.

7.5.2.7 NIC Loses Its File Server Connection

If the NIC loses its connection to the file server, it can take approximately 5 to 10 minutes to reconnect. If the connection is not made after a reasonable amount of time, check the error conditions to troubleshoot the problem.

7.5.2.8 Unable to Print from a Different Context

The NIC does not support printing from a context different from the context you are installed upon. If you want to do this, you must

create an alias queue. See your NetWare Manual for more information.

7.5.3 Troubleshooting AppleTalk Protocol

- Is the Macintosh computer connected to the network through Ethernet, and, has the Macintosh AppleTalk driver been selected? Go to the **Control Panel**, then go to Networks to check.
- Did you select the correct NIC and correct zone?
- Is AppleTalk enabled on the Macintosh?
 Use Chooser to check this.
- If you are on a network with multiple zones, is the zone correct?
- Did you select the correct printer driver in Chooser? You must first select the printer icon and then select the printer name.

Note

- Not all printers can communicate with the default Macintosh driver.

- If you placed the printer in a new zone, did you reselect the zone?
- Are other printers with similar names in Chooser? Make sure you chose the NIC-connected printer.

Appendix A

Jumper Settings

The NIC will normally automatically configure the network configuration without the need to access internal jumpers. However, there are certain jumpers on the card that you may have to access under certain circumstances. If you need to change the jumpers, follow the steps in this section.

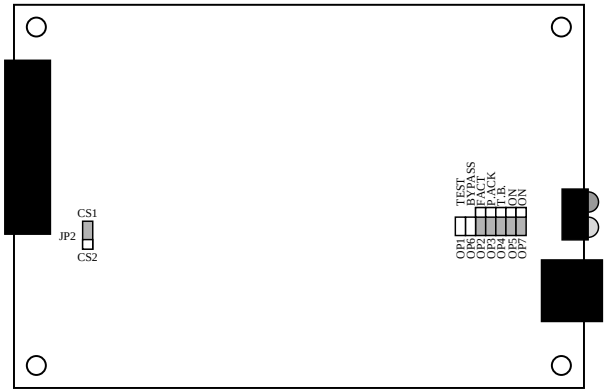
HANDLING PRECAUTIONS FOR STATIC SENSITIVE DEVICES

The Network Interface Card is normally contained within the printer which acts to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment.

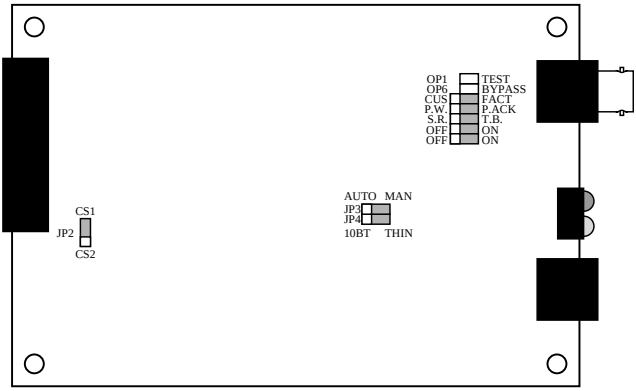
Make sure you do not have the printer plugged into a wall outlet. If it is, unplug the power cord BEFORE you open the unit. Remove the NIC according to the printer instructions.

A.1 Network Interface Cards and Jumper Locations

The illustration below shows the location of each of the jumpers on the Ethernet NIC.



10/100BaseT



10BaseT/2

Note

- The shaded areas indicate the default pin positions.

A.2 Reset to Factory Default

The NIC may be restored to factory default conditions by jumper (OP2). The function of OP2 is to reconfigure NVRAM. This is done when a unit is moved from one site to another and should be restored to as “as-new” condition.

If the unit is powered up with a jumper in the OP2, the board will go into a “reset all parameters to Factory Default” state. This will be indicated by the three quick green flashes followed by the alternating red and green indications (once per second rate). This special indicator sequence means that the NVRAM parameters have been reset to factory default values. Now turn off power and shift the OP2 jumper to the default position. The unit will operate normally when you turn the power on again.

A.3 Address Select

Access to the shared memory interface by the printer can be within one of two memory address blocks. They are identified as CS1 and CS2. If just one card is used, the CS1 space is used. The address space is selected by JP2. With the jumper set to pins 1-2, CS2 is selected. With the jumper set to pins 2-3, CS1 is selected.

A.4 BUS Handshake

The bus handshake signal may be altered to match with your printer controller. Normal handshake signal is WAIT- signal (OP3 set to pins 2 and 3). Check your printer manual to determine if your controller requires the alternate handshake signal ACK/RDY- (OP3 set to pins 1 and 2).

Appendix B

Specifications

B.1 Network Interface Card

The following tables provide general specifications for the NIC.

Network Interface Card General Specifications

Size:	125.00 mm length × 95 mm height
Weight:	10Base T/2 : 3 10/16 oz. (102.5 g) 10/100 Base T: 3 3/16 oz. (89.5 g)
Environment:	0 to 50 degrees Centrigrade, 5% to 80% humidity
Controls and Indicators:	One green LED and one amber LED
Configuration:	Stored in non-volatile memory
Connectors:	Ethernet: 8-wire RJ45 10/100BaseT or BNC 10Base2

B.2 10/100BaseT/UTP Cables

Use the following universal Ethernet standard when configuring your 10/100BaseT/UTP cables to connect to the RJ45 connector on the NIC. The cable should be Category 5.

Pin Number	Color	Ethernet
8	blue/white	
7	blue	
6	orange/white	Receive –
5	green/white	
4	green	
3	orange	Receive +
2	brown/white	Transmit –
1	brown	Transmit +

MEMO

Appendix C

Using a Web Browser

The NIC and printer have an onboard HTTP server, so a standard Web browser can be used to make printer status monitor and network related settings. For details, see the *PageScope Light User's Manual*.

C.1 Accessing the HTTP Server Screens

Perform the following steps to access the HTTP Server screens from your browser.

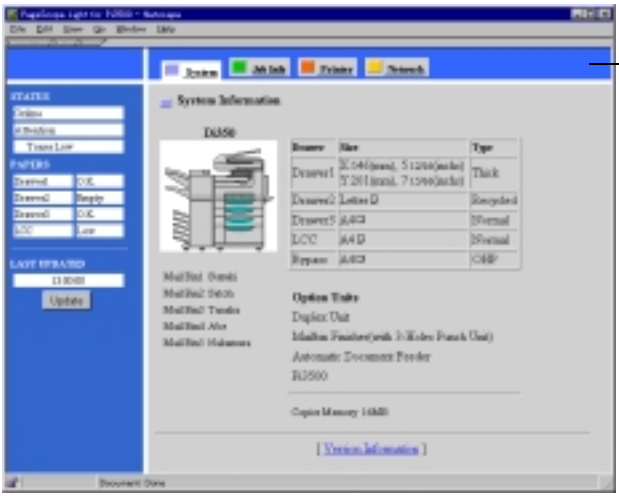
1. Start up your browser.
2. Enter the URL below:

   ```
   http://<NIC IP address>
   ```

 For example, you would input the following if your NIC has the IP address: 192.9.200.200.

   ```
   http://192.9.200.200
   ```

3. The top page that is shown below will appear on your monitor..



The top menu appears in the upper-right area of the top page.

Menu Options

System Displays various information regarding the configuration of the printer including options, trays and memory capacity.

Job Info Allows you to manage the print jobs that are being processed by the printer.

Printer Allows you to specify all of the basic settings of the printer.

Network Allows you to specify all of the basic settings of the NIC.

Note

- The contents of this manual explain the settings of the NIC only. Please see the PageScope Light Manual for other references.

4. Jump to the Network page by clicking **Network** the last item to the right on the top menu. For details, see *C1.1 Network page*.

Note

- By pointing your browser to the URL below, it is possible to enter settings exclusively for the NIC.

  ```
  http://<NIC IP address>/nic/
  ```

 For example, you would input the following if your NIC has the IP address 192.9.200.200:

  ```
  http://192.9.200.200/nic/
  ```

 However, the top menu will not appear when using this procedure and the System, Job Info and Printer menu items will be unavailable.

C.1.1 Network page

Network functions are performed from the Network Settings page.



Note

- Depending on the version of the utility you are using, the appearance of the screen may differ from that shown above.

Click on a link to jump to the corresponding page, where you can make the settings indicated by the link text. Of course, you can also use the navigation features (Back, Forward, etc.) of your Web Browser to move between screens.

Note

- You need Supervisor or Administrator privileges to have full use of Web browser capabilities. The factory default management password is: "**sysadm**".

Important!

- To change network settings you must first type the correct password (same as the management password) in the password field provided.
- Clicking a button to execute a network setting change operation while the wrong password is in the password field causes the password error screen to appear, without changing the setting.

C.1.1.1 Reset

Use this screen when you need to reset the NIC to allow newly set parameter values to take effect.

Note that resetting the NIC fully initializes the network interface, without initializing the interface with the printer.

C.1.1.2 Factory Defaults

Use this screen when you need to restore the factory defaults when you move the NIC to a new location or to clear incorrect settings.

Note

- Settings made will not be recognized by the printer until the power to the printer is turned off and then on again.

C.1.1.3 Unit Status

This screen shows the status of each protocol.

C.1.1.4 Network Address

The serial number of the unit as well as the MAC Address can be confirmed from this screen.

C.1.1.5 Change Password

The password you specify here is the one you type in before changing NIC parameters and printer settings.

Your password can contain letters, numbers, and punctuation.

Note that the password is case-sensitive, which means that the system distinguishes between upper-case and lower-case letters.

C.1.1.6 Setup NetWare

This screen is for making NetWare environment settings.

See *Chapter 4 NetWare Configuration* for details on configuring NetWare.

C.1.1.7 Setup TCP/IP

This screen is for making TCP/IP environment settings.

See *Chapter 6 TCP/IP Configuration* for details on configuring TCP/IP.

C.1.1.8 Setup AppleTalk

This screen is for making AppleTalk environment settings.

Important!

- This function cannot be used in combination with the printer. To change the printer name, use the LaserWriter Utility or other printer utility.

See *Macintosh documentation* and *Chapter 5 AppleTalk Configuration* for details on configuring AppleTalk.

C.1.1.9 Test Print

Click this option to print a test page.

C.1.1.10 Configure Status Page

Click this option to specify whether or not a status report should be printed whenever printer power is turned on.

C.1.1.11 Unit info

This screen shows you the version of your Network Interfacecard. Clicking on the **Unit Serial Number** jumps to the Network Address screen.

C.1.1.12 Language

This network card supports the following language modes.

- US-English
- UK-English
- German
- French
- Italian
- Dutch

The default language mode is US-English.
To change to another language mode, click the Language menu item and select the mode you want on the screen that appears.

Note

- When power to the printer is turned on, the language mode of the NIC will automatically correspond to the language setting of the printer. However, if the printer is set for a language other than one of the six listed above, the language mode for the NIC will revert to US-English.
- When only the NIC is rebooted, the language mode that is saved in the NVRAM of the NIC will be restored.

C.2 Supported Web Browsers

The Network Administration page can be accessed via the following Web browsers:

- Netscape Navigator 3.x, 4.x
- Microsoft Internet Explorer 3.02, 4.x

Use of a Web browser other than those listed above may result in loss of some browser functions.

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